THE

VETERINARY JOURNAL

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Editorials

THE ROYAL SOCIETY OF MEDICINE.

Official Acknowledgment of the Veterinary Branch in the Constitution.

In the April issue of the VETERINARY JOURNAL we published in full certain paragraphs of the proceedings of the Council of the Royal Society of Medicine, which illustrate in a marked manner two points of considerable interest to the veterinary branch of the great tree of Medicine.

One is that the experiment which was made by the Society, shortly after the Great War, of adding a branch of Comparative Medicine (the members of which, it was understood, would mostly be veterinarians), has proved to be an unqualified success. In fact, this latest baby added to the family has not only grown into a healthy child, but the Section is one of the strongest in numbers and one of the most vigorous.

Now, by a further modification of the rules, veterinary Associates are admitted, and in every way the holder of the M.R.C.V.S. Diploma takes his place side by side with his medical *confrère*.

The Associateship is of great value to any young graduates, especially those of a studious temperament; for the privileges of being

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an Associate of the Royal Society of Medicine, which include the use of a library of over 100,000 volumes, are his for the payment only of an annual subscription of three guineas instead of the usual five (if a London resident) or three (if in the country) and without, too, any entrance fee. This privilege lasts for five years after date of graduation. To a young beginner, by whom finance has to be considered, this is a real boon and we commend its consideration to those of our graduates who stay in, or near, London; or who return to take up a post-graduate period of study.

THE ROYAL VETERINARY COLLEGE REBUILDING FUND.

THAT the plight of the Royal Veterinary College has at last attracted public attention is shown by the fact that, in reply to a question asked in the House of Commons by Capt. Crookshank, Mr. Guinness, the Minister of Agriculture, stated that he was well acquainted with the unsatisfactory condition of the buildings of the Royal Veterinary College, and of the consequent difficulties under which the College laboured, concluding his remarks with the words, "I appreciate the importance of this subject and will do everything in my power to assist the College."

Our American contemporary, the *North American Veterinarian*, has also taken up the cudgels on behalf of veterinary science being supported by Government contributions and not left to private enterprise, quoting as an illustration of a sign of the times that in America the veterinary schools passed through the stage of transition from being kept up by private support to their present much better equipped and remodelled status of being attached to universities and State supported.

The readers of THE VETERINARY JOURNAL, and especially those who can claim the London College as their Alma Mater, will be pleased to know that their efforts to help their old school have at length borne sufficient fruit to enable the Governors to consider the question of commencing the rebuilding scheme.

It is, however, a big task to raise the £250,000 necessary to carry out the scheme of rebuilding, and of equipping and endowing the respective Chairs, but with the help of its many friends and well-wishers the object is bound to succeed, and England will then have a College which will be able to hold its own with any other veterinary teaching school in the world.

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General Articles

A SURVEY OF THE DEVELOPMENTS OF RESEARCH INTO BOVINE CONTAGIOUS ABORTION DURING THE PERIOD 1895—1928.

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Introduction.

BOVINE contagious abortion, the incidence of which is world wide, is still causing tremendous economic losses, the precise extent of which it is impossible to determine, as the potential value of the calves which do not reach maturity cannot be assessed.

Development of improved methods of eradication of the disease has of late years been slow, and there is as yet no general agreement between veterinarians as to the relative value of the various lines of treatment.

As the literature of the subject is so scattered, the writer thinks that a survey of the developments in our knowledge of it, with references, may prove useful, and serve to focus attention on current aspects of the problem.

An endeavour will be made to deal with all the salient points which the various researches have revealed, a somewhat difficult task in view of the amount which has been written on the disease since the discovery of the causal organism by Bang in 1895.

In order to ensure continuity, it has been thought best to preserve chronological order as far as possible, and so make the survey an historical one.

For the purposes of serial publication the survey will be divided into sections.

I.

Abortion as a spreading malady affecting the domestic animals, has been known from very early, possibly even from Biblical times, but it was only during the last century that inquiry definitely established the view that there are infectious and non-infectious types.

Abortion in cows and sows was reported in Germany in 1777, but no serious attention appears to have been paid to the subject, either there or elsewhere, until a much later date.

The seriousness of the disease in cattle was recognised in this country when, in 1886, a question was asked in the House of Commons as to the advisability of making regulations to control it under the

Contagious Diseases of Animals Act. The following year the "Contagion Theory" was first definitely expressed by a committee appointed by the Highland and Agricultural Society of Scotland.

At this period investigations into the nature of the disease were being made in Denmark, but no material progress was made.

A committee of inquiry was formed by the Royal Agricultural Society of England, at the request of the Board of Agriculture.

As a result of the inquiries made, it was found that abortion was sometimes followed by sterility, and that in succeeding abortions the period of gestation was usually prolonged.

Evidence given indicated that the disease might die out in a herd in three to five years if no fresh cows were introduced. Advice was given to owners not to serve animals until three months after abortion.

At this time methods of treatment were entirely empirical, and carbolic acid was frequently and uselessly administered for curative purposes.

Nocard[1] in 1888 was probably the first person to make a definite attempt to discover the causal organism, and although he was not successful in this, he reported successful treatment of 11 infected herds by disinfection of cowshed floors with copper sulphate solution, and by the vaginal injection of a solution made up of bichloride of mercury, distilled water, and glycerine.

As M'Fadyean[2] remarked at that time, the disease was even then recognised as being nearly as serious as bovine tuberculosis.

The Highland and Agricultural Society's Committee[3] made a second report in 1889.

This committee showed that abortion could be caused by the infection of healthy pregnant cattle per vagina with the vaginal discharge from aborting cattle. Some of the experiments were negative.

Culture was attempted from the vaginal mucous of aborting cows, and five types of organism were isolated, but no definite opinion was formed, and no organism morphologically similar to *B. abortus* was discovered.

Berner[4] in 1891 recorded some success in dealing with the disease by isolating aborters, but doubt was cast on the infectious nature of the outbreak he dealt with.

These investigations paved the way to the discovery of the causal organism by Bang[5] of Copenhagen on the 19th December, 1895.

Bang assisted by Stribolt, examined the thick yellowish turbid liquid present between the uterus and the fœtal envelopes in an infected cow, and found in pure culture a very small gram negative bacterium, and cultivated an abundant growth of it on artificial media.

In 21 other cases of abortion the same bacteria were found. The organism was also found in the fœtal intestinal tract.

Two cows, three months pregnant, were injected per vagina with cultures, and one aborted at five months. The organisms were recovered from the exudate found between the uterus and envelopes in the animal which aborted, and the other animal when killed also showed infection with the bacilli.

As a result of these initial researches Bang formed the opinion that " Epizootic abortion ought to be regarded as a specific uterine catarrh, determined by a definite species of bacterium."

He found that the uterine mucous membrane was not strikingly altered, but as he remarked " a chronic catarrh is not necessarily associated with striking anatomical alteration."

These experiments of Bang's are classic in that they established the etiology of the disease, and enabled other investigators to work on a sure foundation ; and they must be dealt with here in some detail.

The first experiments in the isolation and culture of the organism were made by the use of shake cultures, using a medium originally introduced by Stribolt.

This consisted of agar-gelatine ($\frac{3}{4}$ per cent. agar and 5 per cent. gelatine) liquified and cooled to 45° C., and then mixed with half its volume of sterile serum.

Into tubes of this the exudate was sown, and the medium in them cooled and solidified by a stream of water.

It was found that growth only took place in a zone $\frac{1}{2}$ cm. under the surface, and had a thickness of from 1 to 1·5 c.m, so that the organism was not regarded as either aerobic or anaerobic.

This peculiarity of the organism Bang found to be a very useful characteristic, as he was able to recognise the specific bacillus even when present in impure cultures.

Stribolt replaced air by oxygen in flasks lined with a thin stratum of agar-serum, and got growth of the bacteria *on* as well as under the surface of the medium.

The fact that the nitrogen of the air exerted no inhibitory influence on the growth was demonstrated by inoculating medium and submitting it to air at a tension of five atmospheres. The partial pressure of the oxygen was then practically that of pure oxygen, and zones of growth were obtained similar to those obtained when the latter was used.

Rarefaction of the air to a pressure of two inches of mercury was found to stop growth either in or on the surface of the medium.

It was considered, therefore, that the bacillus of abortion had two optima in its behaviour to oxygen, one being a tension of oxygen

in the medium of less than that of the atmospheric air, and the other a tension much exceeding it.

Further investigation led to the discovery of the organism of abortion in the exudate surrounding mummified fœtuses, and cultures were obtained in the usual manner.

In one case the bacilli were found at an estimated period of nine months after the death of the fœtus.

Bang regarded these cases as evidence of the great vitality of the abortion bacillus.

These cultural studies were followed by experimental vaginal injections of pure cultures of the organism into two pregnant cows whose antecedents were known to be free from infection. Abortion was caused in one case, and the organism was isolated from the uterine exudate, and in the other, on slaughter the organism was also found in the uterus. In both cases on *post-mortem* the usual subchorial œdema was present.

As two inoculations of virulent material were made, it was not possible in these experiments to definitely determine the incubation period, but Bang formed the opinion that it was probably ten weeks.

He at this time considered the possibility of obtaining diagnostic indication of the presence of the disease by the subcutaneous injection of live cultures of the bacillus, to be followed later by the use of sterile cultures.

He found that a febrile reaction was produced in a cow infected per vagina, when later injected subcutaneously with live bacilli.

But a similar febrile condition was produced when a healthy bull calf was treated in the same manner, and so diagnostic reactions were not experimented with further at this stage of the investigations.

By sheep experiments Bang proved that abortion bacilli could be introduced into the uterus through the blood stream.

It was usually considered that in natural cases of infection in cattle, the avenue of infection was by the sexual organs, but the blood stream experiments indicated that the respiratory and digestive tracts were possibly responsible for cases which could not be accounted for on the other hypothesis.

The experiments with sheep were followed by an experiment with a pregnant mare, which was given an intravenous injection of a bouillon serum culture of the organism. A month later the mare gave birth to an under-sized foal which died a few weeks later. The uterine exudate contained masses of abortion bacilli which were cultured satisfactorily.

At this period Bang thought it highly probable that epizootic abortion in mares was "determined by the bacillus discovered by

us," and thought it possible that cows and sheep might convey infection to mares.

No experiments were performed with goats, though Bang noted that several of his colleagues had observed abortion in goats kept with aborting cows.

All this work emphasised the importance of isolation and disinfection as being the only rational methods of dealing with the disease applicable at this time.

In Bang's own words "The discovery of the abortion bacillus will, it may be hoped, exert on the rational prophylactic treatment of abortion a stimulating influence similar to that which the discovery of the tubercle bacillus did in the case of tuberculosis."

During the next ten years Bang continued his researches, but little progress appears to have been made in this period by other workers.

In 1902 Preisz[6] confirmed Bang's findings *re* the cultural characteristics of the organism and its peculiar behaviour in relation to oxygen.

In July, 1906, Bang[7] addressed the National Veterinary Association in Liverpool and reviewed his work on abortion.

By this time he had convinced himself, by feeding experiments, that one of the ways by which infection was transmitted from animal to animal was by means of the alimentary tract, and soiled fodder was regarded as a source of danger.

He did not believe that the organism ever led a saprophytic existence, and his oxygen tension experiments at that time supported this opinion. At the same time he found that, like many other pathogenic bacteria, it could remain virile outside the animal body for a long time. Bacilli in uterine exudate preserved in tubes in an ice chest were living after seven months, and were subcultured.

The bull at this period was regarded as at least a mechanical carrier of infection.

Bang recorded experiments on sheep, in which ewes were immunised with serum-bouillon cultures, and later served. They resisted artificial infection by feeding, but aborted when infected intravenously.

Intravenous injections of the organism into cows prior to service, produced variable immunity results, and it was found that the calves were more likely to reach full time when their dams were injected several months prior to service.

Experiments made on sheep and goats, using organisms killed by toluol, indicated that dead bacilli had not the same immunising power as living ones. These were followed by experiments on cattle which produced parallel results.

Bang had so far satisfied himself as to the value of the use of live cultures, as to allow himself to express the view that possibly efficient results might be obtained if further modified experiments were made.

In 1908 Nowak[8] described a new method of cultivation of the organism, which consisted of growing it in sealed jars in the presence of *B. subtilis*, which reduced the oxygen pressure, and allowed a satisfactory surface growth of *B. abortus*.

This method has been found to be a very useful one, and has been used extensively since that date for obtaining primary cultures from bovine excretions.

M'Fadyean and Stockman, while not doubting the oxygen tension experiments which Bang made with Danish strains of the organism, found that, using English strains, although primary cultures required special atmospheric conditions, secondary and succeeding cultures could be obtained under ordinary aerobic conditions.

In Britain at this period a definite scheme of research was formulated by a Departmental Committee on Epizootic Abortion appointed by the Board of Agriculture.

M'Fadyean and Stockman[9] as members of the committee, undertook the technical part of the investigations, and made a report of their progress in 1909.

Their first step was to make observations on the distribution of the disease. They examined swabs from aborting cattle all over Great Britain, and infection was found to be widespread.

They next investigated three methods of diagnosis.

(1) The Agglutination Test.
(2) The Complement Fixation Test.
(3) The Reaction Method (Thermal).

(1) The Agglutination Test.

They pointed out that agglutination as a diagnostic phenomenon was discovered by Widal in 1896, when he found that the sera of patients affected with enteric fever contained a substance which agglutinated a culture of typhoid bacilli.

When they came to apply the test to the organism of bovine abortion they had at first great difficulty in preventing the bacilli from clumping prior to the addition of specific serum, but later, methods of cultivation were found by which it was possible to obtain homogeneous suspensions, and the application of the test became possible.

They found that clumping of the organisms on incubation with apparently normal serum, took place in dilutions of 1 in 25 in a few cases, but that usually, normal serum caused some agglutination in

dilutions of 1 in 10 and not higher. Partial agglutination was recorded with the serum of an artificially infected heifer, at a dilution of 1 in 800, but 1 in 500 was considered the maximum titre for most cases of infection. Milk from an animal which had aborted agglutinated at a dilution of 1 in 25. The strength or turbidity of the bacterial suspension was not stated.

That the results obtained were at this time viewed with great caution the following quotation shows. "Having regard to what has been the experience in other diseases for which the test has been extensively used, the difference between the agglutinating power of the serum of a cow affected with abortion, and that of some normal animals, is too slight to inspire confidence in the test."

(2) The Complement Fixation Test.

The sensitising serum was prepared by immunising a goat with defibrinated cow's blood, and suspensions of the bacilli from cultures of *B. abortus* of various ages, were used as the antigen. In other respects the technique was similar to that used in the Wasserman reaction.

The results obtained, though promising, scarcely justified the detailed work involved in the setting up of the tests. The trouble and time occupied in determining the number of units of complement required to balance each hæmolytic system, led to a reduction in the number of tubes employed in each test, to the detriment of the results obtained.

The sera of certain animals which had aborted three months before, gave complete hæmolysis, and it was thought likely that an excessive amount of complement was used.

It is probable that at this time the fact that serum, complement, and antigen possess threshold values, was not fully realised.

Confidence in the agglutination test was not, as we have seen, so far established as to justify its use in the control of these complement fixation reactions, and the results had therefore to be judged entirely on the history of infection pertaining to each animal.

The work done on this test was useful in that it provided a basis for the researches of other workers who later carried the investigations a stage further.

(3) The Reaction Method.

An abortin analogous to tuberculin was prepared and injected subcutaneously and intravenously into animals whose history was known.

Clean heifers which were injected subcutaneously did not show a rise of temperature above 103·6° F., and animals with a history

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of infection, natural or artificial were considered to be reactors if they showed a rise to 104° F. The margin between reactors and non-reactors therefore was in a number of cases a very narrow one. Both workers considered that a large number of field tests would be needed before the utility or otherwise of this method of diagnosis could be determined.

As with the other two tests the accuracy of the reactions could only be judged on the history of the animals.

Subsequent trials failed to establish the practical value of the test.

These preliminary investigations on the part of the British Committee aroused much interest in Europe and the United States, with the result that many more workers commenced to study the disease.

(To be continued.)

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TUBERCULOSIS IN CATTLE.

A Lesson for Mankind.

By JOHN P. SUTHERLAND, M.D., Sc.D.,

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"The whole history of life, both human and sub-human, teaches us that nature will not condone disobedience: . . . . . no living being stands above her law, and protozoon or demigod, if they transgress, alike must die." Dr. Lothrop Stoddard, in "The Rising Tide of Color," p. 304.

ACCORDING to Dr. E. A. Crossman, inspector for the National Department of Agriculture in Massachusetts, New Hampshire and Rhode Island, more than 300,000 cows have been slaughtered in the United States during the past six years on account of having tuberculosis. (*Boston American*, November 23rd, 1923.)

It is also claimed that $40,000,000·00 worth of cattle in the United States are tubercular, and the percentage infected in the different States varies from 1 to 30 per cent. of the entire number of cattle.

Through the courtesy of Dr. Lester H. Howard, formerly Director of Animal Industry of Massachusetts, we learn that out of 168,870 dairy cattle in the state, 1,552 were condemned in 1922, on exhibiting physical symptoms of tuberculosis; and out of 17,196 head subjected

to the tuberculin test 2,572 reacted. As all reactors were slaughtered there was a total of 4,124 tubercular cattle killed in the state during that year, or one in 41.

It is generally accepted as a fact that animals living the unrestricted, natural life are not afflicted with tuberculosis. Reliable statistics covering this point are not easily obtainable; but in the latest contribution to the study of the general etiology and morbid anatomy of tuberculosis in Cecil's " Text-book of Medicine " (1927), representing the most modern views in the field of medicine, p. 167, we read: " Tuberculosis occurs so rarely among wild animals as to be of no significance."

Everyone knows that the Great White Plague still flourishes and exacts its high toll of human life. More than 100,000 persons die from it annually in the United States, or to be as exact as possible, 90,452 deaths occurred in the registration portion of the United States during the year 1922, according to compilations made by the Bureau of the Census of the Department of Commerce (*Boston Medical and Surgical Journal*, Dec. 23, 1923, p. 1052); and practically the same number, or 89,724 during the year 1924. The registration area contains 85·3 per cent. of the entire population of the country, so the total mortality from tuberculosis would reach well over 100,000, and this heavy mortality is in spite of state Sanitaria, energetic campaigns against tuberculosis, wide educational propaganda, governmental restrictions, fresh-air schools, and other preventive measures. Moreover, it is stated by Allen K. Krause (*vide* Cecil's " Text-book of Medicine," p. 169) that the number of persons ill with the disease is at any time probably tenfold the number of deaths. Generally accepted estimates, therefore, put the incidence in the United States at about 1,000,000 per year. To still further quote Dr. Krause we read (*ibid* p. 170) a careful analysis of statistics from the State of New York which shows that during the year 1922 there were 10,695 deaths from tuberculosis, or about one per 1,000 of the population, and the total number of cases of illness from tuberculosis as shown by infection tests, 10 times the number of deaths, or 100,000. We may, therefore, believe that at least half the people of New York State (taking into account all ages) or 5,000,000 are infected with tuberculosis.

In recent years nothing has been added to our knowledge concerning the cause of tuberculosis. The discovery of the *bacillus tuberculosis* by Koch in 1882 remains the unrivalled contribution to our knowledge of the etiology of this dread disease. Yet it is acknowledged that something more than the germ is needed to produce the disease. The germ is unquestionably the exciting cause, but the

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question of susceptibility looms up as of vital importance. All people, all animals are not at all times equally susceptible. To quote Dr. Krause once more (*ibid* p. 171): "We can detect no races or individuals that are presumably exempt from it, or more or less resistant or immune to primary infection as such. All that we can discover suggests that slight and transient exposure to tubercle bacilli will bring about infection in everyone." The great majority, however, possess sufficient resistance to keep the germ influence at "arm's length." *Upon what does this immunity depend?* The full and correct answer to this question will be of greater value to mankind than the discovery of the germ—a greater contribution to our knowledge, and to our means of prevention. The following facts and ideas are offered as of some possible value in the final solution of the great problem.

It is a widely accepted opinion that "Raw cow's milk is . . . a primary source of bovine-bacillus infection in human beings. Indeed, cow's milk and its uncooked products, butter, cheese, etc., are the only noteworthy animal sources of human infection" (Krause, *ibid* p. 167), and (p. 168), "*Bovine bacillus* infection occurs through the ingestion of tuberculous cow's milk."

Since there are so many cases of tuberculosis among the people of the United States with all the possibilities of spreading infection; since there are so many tubercular cows in the country as a whole, with the possibilities of spreading the disease through infected milk; and since the *per capita* annual consumption had risen in 1923-4 to 1,020 pounds of milk and its products, the subject of the rearing of calves and the feeding and care of cattle is one of vital importance. A brief consideration of the subject is appropriate.

Even city-bred people have occasional opportunity to observe the feeding of calves and to question the why and wherefore of the proceeding. It is well known that during the first few days of life calves may be permitted to nurse freely, but very soon the calf gets no more unmodified mother's milk. It is given a mixture of whole milk, skimmed milk, and meal of some sort, or some artificial preparation advertised to be a good substitute for the one food nature planned it should have.

The following quotations from "Farmers' Bulletin No. 1,336 of the U.S. Department of Agriculture" must be looked upon as illuminative and authoritative, and as representing the most advanced and successful practice in the rearing of calves.

Poorly nourished cows often give birth to weak, puny calves which are hard to raise. The feeding of the calf, therefore, begins before it is born (p. 1).

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Under natural conditions the young calf receives nourishment every two or three hours. In hand feeding it is best to follow these conditions as closely as possible, but because of the trouble and expense (*sic*) involved it has been found impracticable to feed calves more frequently than three times a day. They are usually fed only twice a day.

It is the practice of many dairymen to feed young calves three times rather than twice a day, because the better results obtained more than *pay* for the additional work (p. 4).

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At least four-fifths of all dairy calves are raised on separated milk, grain being used to supply the fat removed. Usually it *pays* well to feed whole milk for about two weeks, at the end of which time separated milk may be used in part. The proportion of the latter may be gradually increased until at the end of the fourth week it is used altogether (p. 5).

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In most cases, at the end of the third week the ration should be approximately one-half whole and one-half separated milk (p. 5).

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At the beginning of the fourth week, from one-half to three-quarters of the milk ration should be separated milk. During the week the change should be continued until by the end of the week only separated milk is fed. With especially vigorous calves the change to separated milk may be made about a week earlier. After the fifth week separated milk may be fed altogether, unless the calf is very delicate (pp. 5-6).

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The time milk should be discontinued depends upon its *cost* in relation to the value of the calf, its breed, size, vigour, etc. . . . six months is probably a good average age at which to wean calves from milk. When the best of hay, silage, and a good variety of grains are available, the calf may be weaned earlier than when such feeds are lacking (p. 6).

* * *

The stronger and more vigorous the calf the earlier it may be weaned with safety. On the other hand, the more valuable the calf, the more expense the owner is warranted in incurring to develop it, and the later it will probably be weaned. If skim or separated milk is plentiful calves may be fed *profitably* until they are eight or ten months old (p. 6).

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Whole milk is " Nature's balanced ration " for the calf. When skim or separated milk is fed, other feeds are used to supply the fat which has been removed. Proprietary calf feeds or meals, for feeding with separated milk, have been put on the market. Many of these have merit, but by using the feeds usually found on the farm or in markets near by, the farmer can generally mix a grain ration which is as good and *costs* less (pp. 7-8).

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In dairy herds in which the entire output is sold as whole milk at high prices, there is a strong demand for feeds to take the place of the milk fed to the calves. While it is probably not practicable to take calves two days old from the cows and raise them entirely without milk, some skilful feeders have been able to approximate these conditions. The time at which calves can be put on milk substitutes depends upon the same factors as in the use of separated milk, namely, the breed, the development, and vigour of the calves, etc. It is hardly safe, as a rule,

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even with the most vigorous ones, to attempt to put them on milk substitutes alone within three weeks after birth ; and with calves below the normal in vigour, some milk for six weeks or more may be necessary to raise them. In supplying a substitute for milk an attempt is usually made to use a liquid which in composition resembles milk as much as possible (pp.8-9).

The virtues of certain " milk substitutes " are then considered in the " Bulletin," such as " bean soup," various " calf meals," " skim milk powder," and adjuvants such as bran, corn, oats, and roughage in the form of hay, alfalfa, green pasturage, etc.

The preceding quotations, backed as they are by the highest national authority, should be most carefully read and even re-read, as they are vital to a rational consideration of the subject under discussion.

Some dairymen claim that calves thus artificially reared grow as rapidly, seem as strong, and get as heavy and big as those fed naturally. And so it may seem on superficial examination, but observations covering a single generation are not sufficient to settle a question of such great importance.

Probable very few calves born in Massachusetts annually are brought up as nature evidently intended they should be. On big stock farms in the Canadian Northwest, in the grazing parts of the United States, and in other parts of the world (Central and South America, Africa, Australia) where stock raising is an industry, the calf is allowed to " run with the mother." Occasionally only this is so in more settled communities. A comment worthy of consideration comes from " S.M.C. " of the Massachusetts Department of Public Health that colts " run with the mother " and tuberculosis is rare among horses.

The result of the artificial feeding is inevitable. *The laws of nature are fixed and inexorable, and cannot be tampered with,* without a penalty being exacted of those who defy her or attempt to improve her methods.

As to the bovine calf, it must be claimed and acknowledged that on its artificial feeding, which cannot equal in value the natural food, it starts life with a handicap, for it does not get during the early formative period of its life the nourishment planned so wisely for it by nature. This handicap may be and undoubtedly is slight, or perhaps comparatively insignificant for the individual calf, but with succeeding generations, all brought up during the early part of their lives, in the same vicious way, and during adult years living in every way an artificial life, the handicap increases and steadily augments until finally a delicate, high-bred, sensitive, weakened strain has been produced, natural immunity and resistance have been reduced, and even under the greatest care as to light, warmth, ventilation

and cleanliness of stables and barns, tuberculosis makes its appearance in the herd; and as not infrequently happens, the entire herd is condemned and the dairyman possibly commences anew to go through the same routine with another breed or strain of cattle.

In the light of this view it is not unreasonable to assume that the unbalanced food, or the artificial diet upon which the domesticated calf is reared, in reality a defying of nature, is the real cause which leads up to a loss of the immunity which is possessed by cattle leading a natural life, and induces in the domesticated cow a susceptibility to invasion by the tubercle bacillus, with the fatal results so well known.

No detailed argument need be presented to fortify a proposition that seems to carry its own convincing power. The evidence presented seems clear enough to warrant the conclusion that:

1. Domesticated bovine calves are not fed as Nature evidently intended they should be.
2. The result is a handicap at the start of life.
3. The forced feeding of cows to increase the quantity of milk and prolong the period of its secretion puts a physiological strain on the animal that increases its handicap.
4. During the course of several generations, all having been subjected to the same treatment, the handicap has increased from generation to generation so much that the animal loses its natural immunity to tuberculosis and, due to its loss of resistance, an invasion of tubercular bacilli occurs with the usual results.

Herein certainly lies a lesson which Man may well ponder most seriously, and intelligently apply to his own tubercular problem. If an artificial, and therefore unnatural food, for the calf, and a forced feeding, also artificial and unnatural for the adult cow, eventually bring about a loss of immunity and permit the development of tuberculosis in the cow, why may not an imperfect and artificial feeding of children and human adults eventually produce not only a susceptibility to tuberculosis, but a condition that will permit the disease to develop and relentlessly run its course? That children and adults *are* imperfectly and artificially fed is a statement amply supported by the average human diet.

The popular method of rearing calves is very evidently a successful method of cultivating a susceptibility to tuberculosis, a method of lowering the natural immunity, or in other words, a method of decreasing the resistance to infection. This resistance doubtless is due to the defensive mechanism developed by the free, unrestrained, natural life.

It is impossible to read such an authoritative bulletin of instruction to dairymen as the one quoted from, without feeling that here we have a convincing explanation of the existence of tuberculosis among cattle, and the same explanation slightly varied as to details is applicable to mankind.

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In the case of cattle the economic or commercial factor looms large upon the horizon, and the question becomes one of finance and not of science. Naturally, there is no charity or altruism in cattle raising or dairying, but there ought to be some rationality, some knowledge of nature.

It is now definitely recognised that there are in milk and other foods certain infinitely small amounts of something, called for convenience a " vitamin," that has only within a few years (since 1912), been known to scientific investigators ; a something which has existed since the dawn of creation for certain fixed purposes ; a something for which there is NO substitute, and under the present state of our knowledge a something for which there can be no substitute ; a something originated by nature ages ago, before man appeared on the earth, and only recently discovered by man. Therefore, is it not reasonable to assume that there are, or at least may be, other things in milk and other foods necessary to life which have not yet been recognised or discovered ? And is it not reasonable to assume that it it is the absence of these vitamins and other things from " foods " given to young calves and humans that undermines their immunity, reduces their powers of resistance and opens the way to invasion by germs : micro-organisms of one sort or another ?

Just what is a " natural " and what an " artificial " food is a question that with our lack of knowledge can be endlessly discussed, but the thoughtful and observant mind need not be harrowed by details when general principles are so obvious.

In the words of the Bulletin, " Poorly nourished cows often give birth to weak, puny calves which are hard to raise," etc. The feeding of all mammals begins during pre-natal life, and the human babe is no exception to the rule. The human fœtus is absolutely dependent during this most important pre-natal period upon its mother for nourishment, and very few mothers can intelligently feed themselves during pregnancy. Therefore the fœtus is not suitably nourished. This is handicap number one for the child.

Subsequently, or after birth the human child is still absolutely dependent upon its mother for natural and adequate nourishment. The fact that so many mothers are unable to breast-feed their offspring as nature evidently intended they should, is convincing testimony to the fact that they have not properly fed themselves, and from the physical standpoint are not equipped for motherhood. Their lack of physical fitness results not only in a pre-natal handicap for the fœtus, but in handicap number two, because babies " raised " on sub-human milk, modified *secundum artem*, are not fed in accord with nature's plan. Such feeding of a so-called " substitute " for mother's milk is

therefore unnatural feeding, and is attended by the penalties of a broken natural law.

Handicap number three comes after the period of weaning, when food that is exceedingly artificial is given the still helpless child, and habits dictated by an unreasoning tradition are formed which usually last through life. The life itself is frequently, deplorably and unnecessarily cut short by lack of ability to resist the attacks of germs of one sort or another. Immunity and power to resist and overcome malign influences cannot easily be built on a foundation furnished by an irrationally fed and therefore unfit mother. Pre-natal feeding, therefore, becomes a matter of supreme importance to both mother and child, for, rationally conducted, it ensures a good start for the offspring and fits the mother for the all-important period of nursing. With a good and thoroughly natural start, the subsequent period of life will naturally show a reasonable resistance to disease influences. It would seem to be food and chiefly, if not wholly, food upon which resistance to the activities of the tubercular (and other) germs depends. It is time to discard tradition and conventionality and the so-called "instinct" (which man does not possess) in the matter of feeding the human body and follow the teachings of biological chemistry and the plain dictates of the natural laws of life. The gifts of Nature in the wide, wholesome and palatable varieties of cereal foods; the almost endless variety of vegetable foods; and the abundant, attractive and nutritious fruits and berries and melons according to their season, as well as the less used but no less valuable assortment of nuts, will surely furnish clean, nutritious food which by clever combinations and mixtures may be made attractive even to the gourmet.

Sunshine, fresh air, bathing, healthful exercises, sanitary schools, factories, offices and barns are all of undoubted service in securing and maintaining health and vigour, but it is after all food, *and food alone*, from which the body and its vitality are developed. And, in-so-far as food is concerned, it is the *natural* and not the *artificial* or the assumed "substitute" that is to be relied upon as an unfailing guide.

OBSERVATIONS ON CALCIUM DEFICIENCY AS A CAUSE OF CERTAIN DISEASES OF ANIMALS AND MAN.*

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An experiment of fundamental importance, on the calcium metabolism of a goat, was recorded in 1913 by Steenbock and Hart.[1]

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I need not go here into minute detail, but the experiment was one carried on for a long period, in which the calcium metabolism, with other details, was carefully observed. At the beginning of the period the animal was in milk; the latter part was post-lactational. Important information was acquired as to the calcium balance under the conditions of experiment. The diet varied from time to time for the purpose of estimating the metabolic balance under different conditions, but it consisted of dry food for the whole time except for a period of two weeks near the end of the experiment. The mineral supply of the ingested food was considered more than sufficient for average normal needs, but notwithstanding this, the calcium balance was found to be consistently negative, not only during lactation, but also after the cessation of the milk flow. During this time, the animal was necessarily in confinement. Then it was let out for two weeks on good summer pasture, and exposed, therefore, also to sunlight. No one at that time knew of the peculiar effect on calcium metabolism of sunlight, nor had the concept of a fat-soluble vitamin been matured. But after the two weeks on pasture in the open, the animal was again placed in the matabolism cage, and put on a dietary under which in the previous period a negative calcium balance had been observed. It was now found that the negative balance had become transformed into a positive balance. There have been numerous experiments more or less similar since that time, and all have tended in the same way.

Why was it so? There had been for months a steady drain on the body calcium through the channel of the intestine. There had been very small utilisation of the lime—if absorbed, it had been excreted again more abundantly than it had been absorbed—and it was evident that the calcium store in the bones had been steadily drawn upon.

The condition, therefore, was that of a calcium diabetes. No other term expresses it so well, and it can be regarded with advantage from that point of view.

Then, after two weeks on good pasture in the open, this tendency to calcium diabetes was found to have disappeared.

We know now that vitamin *D*, one of the group of three fat-soluble vitamins, possesses the power of stopping this kind of calcium diabetes, and that it is present in good grass pasture. We know also that certain of the ultra-violet rays present in sunlight are able to do the same by activating a lipoid substance present in the animal. The rays actually cause the vitamin to be formed.

If the demineralisation of the bones is sufficiently great, it can be recognised by X-ray evidence, and later by clinical evidence. It

is usually referred to as osteoporosis. In its more advanced clinical forms, when bending and breaking occur, it constitutes osteomalacia. Osteoporosis is found in infancy as an accompaniment of the clinical condition that goes by the name of rickets.

A few words may be devoted here to the concept of rickets. It has become of late years the custom to restrict the term to cases in which one of the conditions is a peculiar abnormality in the X-ray appearance at the growth zone. This, for instance, was used as a distinguishing mark in E. Mellanby's[2] studies on puppies fed on various rickets-producing diets. According to Mellanby's use of the term, the change conventionally significant of rickets was only noticed in actively growing animals, and not in those whose growth was slow. In both classes there were signs of demineralisation of the bone. But in the latter class, it was no longer " rickets," but " osteoporosis." Now, for the purposes of study it is necessary to conventionalise distinctions. But the mind is fallible, and we are all of us too apt to assume implicitly that a difference of names betokens, at once and throughout, a difference of things. And through looking intensely at a part we may lose sight of the panorama. Neither of the names denoted a normal bone condition, but some degree of osteoporosis existed in either case. The definition of rickets is not a definition of the whole disease from which the puppies suffered.

There is not at present a rigid conventional description limiting the application of the term " osteomalacia." Osteoporosis is a feature common to both osteomalacia and conventional rickets ; so is osteoid tissue. In cattle, clinical rickets appears to be specially frequent in the younger animals of a herd whose adult members are suffering from osteomalacia and its accompaniments, such as stiffness, twitchings, lameness, and pica.

Soil Conditions in Relation to Deficiency Disease in Animals.

In working through veterinary literature on osteomalacia, rickets, and associated conditions of disease, I found my attention over and over again attracted to the character of the soil, climate, and vegetation, in their relation to the prevalence of cases. There seem at first to be utterly incompatible dissimilarities in the conditions that are thought to favour the prevalence of these diseases. According to Friedberger and Fröhner[3] osteomalacia is more common in stall-fed animals than in animals at pasture, and more in certain stables or on certain farms than on others. But it is quite well known as tending to affect animals at pasture under certain conditions, and these conditions may seem dissimilar. The syndrome occurs with special frequency on poor soils, often on sandy or granitic land, or in other

cases on hard cement-like clayey soil. Another soil-type is flat, ill-drained, more or less swampy or water-logged land. The disease is liable to occur on what are described as peaty soils, and, in general, on soils whose characteristic vegetation is coarse and rank. All the soil types enumerated are usually low in their content of calcium and phosphoric acid, and this fact had frequently been alleged as sufficient to account for the prevalence of the disease in them. But that fails to explain why animals pastured on the same land may at one season do well, and at another time show osteomalacia and rickets, with the various other signs of ill-being that precede and accompany these manifestations. Moreover, under certain conditions, signs of the disease can occur on apparently rich volcanic soil. We meet also a curious paradox, on the one hand a tendency of the disease, or disease complex, to prevail in season of drought, and on the other hand a prevalence in seasons of constant wet and flooding of the ground.

If we search beneath superficial appearances, we are able, I think, to trace certain interesting features in common. The soil conditions quoted arouse instant questioning. Here are the conditions in which excessive soil acidity is commonly found. And they all agree in being conditions in which soil-nitrification is relatively low and defective. There are two sources of supply through which nitrates for plant food are acquired. One is through breaking down of organic matter by bacterial action through ammonium compounds to nitrates and thence to nitrates ; and the other is through fixation of atmospheric nitrogen, dispersed in the soil, by certain special types of bacteria. The earlier stages of the former process appear to be independent of aeration, but the stage of nitration requires oxygen. The nitrogen-fixing bacteria are independent of organic nitrogen, but require aeration of the medium in which they work, and it is to be remarked that an aerobic bacterial flora is a characteristic general feature of soils in which nitration is being efficiently carried on. The soil bacteria concerned with this process require a suitable physico-chemical environment for their working conditions, and the further removed they are from suitable conditions, the less their activity. For instance, they require a suitable temperature ; at low temperatures their activity is greatly reduced, and it ceases entirely a few degrees above freezing point. Furthermore, a high acidity interferes with nitrification, though nitrates are said to occur in some highly acid soils. Again, the soil moisture has in various ways a large influence, nitrification being interfered with both by wetness and by undue dryness, and, moreover, the moisture content of the soil must be held in the right way, that is, as a thin film round the particles. A

soil of fine texture will be much better than a coarse sand; it holds water without waterlogging, since it offers an enormously greater surface for the film. A cement-like mass of hard clay admits neither of aeration nor of drainage. The physical condition of the soil is therefore in certain ways as important as its chemical constitution.

Soil acidity may be of organic or of mineral origin. In the one, there is an accumulation of acid products resulting from the presence of incompletely decomposed organic matter, as in the peaty type of soil; in the other, there is a mineral acidity derived from the silicates. This would be the acidity found in poor sandy and granitic soils.

Analyses of grasses grown on many poor soils have shown an ash decidedly low in calcium and in phosphorus, or presenting a calcium : phosphorus ratio different from the ideal requirement, so as to make the deficient element of the pair a limiting factor for the other. These grasses have also shown a high silicon content, tending to shift the acid : base balance to the acid side.

C. W. Stoddart published in 1908[4] a suggestive paper on phosphate availability in relation to soil acidity. I may quote here a paragraph :—

> Turning now to the phosphoric acid soluble in N/5 nitric acid, it is seen that considerably more is extracted from the non-acid soils than from the acid soils. In other words, the non-acid soils contain more calcium phosphate than do the acid soils. This is to be expected if soil acidity is the cause of the lack of available phosphates.

He further summarises his results as showing that acid soils lack available phosphate, and states also that figures on humus and phosphoric anhydride in humus suggest that humic phosphorus may be unavailable to plants.

The animal diseases that we have been considering, though common on poor soils, occur also on volcanic soils in which there is abundance of calcium and phosphorus, but it would seem that these soils are then in a highly acid condition. Even soils derived from, and situated on limestone may be strongly acid. And it should be noted that the soil condition may vary at different seasons of the year, so that at one time there is evidence of good nitrification, with growth of good sweet grass, and at another time the vegetation may be poor and withered, or poor in another way, being what graziers would call " sour."

We may refer here to the interesting work of Bottomley on[5] the increase of nitrogen fixation by *Azobacter chroococcum*, a nitrating organism, and on the improvement of plant growth by the action of aerobic bacteria grown in peat which had been sterilized and afterwards inoculated with aerobic forms. This he attributed to water-soluble stimulating substances which he designated "auximones" produced by these aerobes.

Russell and Hutchinson[6] have shown that in some soils there is an excessive profusion of protozoal organisms which exert a very deleterious effect by destroying or inhibiting the growth of bacteria which are necessary to the well-being of the higher forms of plant life.

May I here draw a bow at a venture? It is quite conceivable that beyond calcium and phosphorus there may be some other dietary factor present in good sweet pasture grass, and deficient in pasture grown on acid soils. One can, for instance, imagine the possibility that the sterol which forms and carries the fat-soluble vitamin now known as vitamin *D* has to be derived by animals from plants, and that plants grown on poor acid soils do not provide it. Perhaps the higher plants have to procure it from soil bacteria that grow with difficulty or not at all in some soil conditions, and well in other conditions. This is mere conjecture, but such conjectures provide points of view, and sometimes form a fruitful basis for study.

However this may be, it is certain that soil conditions have some connection with food values. Analyses of soil from farms in the Bega district of New South Wales,[7] where many cattle had been suffering from osteomalacia, showed that they were all strongly acid. In non-affected farms the soil reaction varied from neutral to faintly acid. Analyses of the prevailing grasses showed on the affected areas a low percentage of phosphoric acid and lime, and even in the non-affected it was low in comparison with some published analyses of European and American grasses.

The difference to the animal intake would depend on quantity of grass available, on appetite, and on assimilative efficiency. The second and third of these can depend, amongst other things, on vitamin supply, vitamin *B* for the appetite. Probably assimilative efficiency can be affected by all varieties of avitaminosis, but certainly by lack of vitamin *D*. An animal would have to eat more of, and digest better, a food supply low in necessary mineral matter. The supply must always be above the lowest limiting factor, and if assimilation is bad, then the supply must be higher still. When the total calcium of the diet is not far above the threshold point, or critical minimum, it becomes relatively easy to upset equilibrium, either by a decrease in absorption or by an increase in excretion.

In the young growing animal this would be accentuated, as it would also in the breeding or lactating cow, whereas the adult bullock would be able to balance on a smaller intake. A working bullock, if efficient for work, must eat a large total quantity of food to provide calories for expenditure in work. This would bring up with it the gross mineral intake, and if a sterol or potential vitamin were required, the intake would presumably increase in the same way. Thus, if

either were dangerously scanty in the fodder, the larger gross quantity of food taken would protect the animal.

Osteoporosis of Horses: Bran Disease.

In 1905, D. Hutcheon,[8] then Chief Veterinary Surgeon in Cape Colony, contributed an article on "Osteoporosis," illustrated with some good coloured plates, to the *Agricultural Journal of the Cape of Good Hope*, the name being applied to a certain pathological syndrome observed in horses. He quoted extensively from an account by Captain A. H. Lane, A.V.D., on serious outbreaks involving army horses at Wynberg in 1898, and mules at Middleburg in 1904. The diet of the horses was maize seven pounds, colonial oat hay ten pounds, salt half an ounce, bran one pound. It was while on this diet that the animals became affected. It was then changed to oats five to six pounds, lucerne hay eight pounds, green forage four to six pounds, bran two pounds, salt half an ounce, bone meal one and a half ounces. Rapid improvement ensued, and with the exception of some dozen very bad cases out of about four hundred horses, all became workable.

Note the difference in diets. In the former, no green food and a low mineral content, especially low in calcium, which would probably become to a considerable extent a limiting factor for the phosphorus, even if the phosphorus were otherwise sufficient. In the latter diet there was both green forage and an abundant and also a better balanced, mineral supply. In subsequent correspondence, Lane expressed the opinion that the disease was due to a deficiency of phosphates in the food, aided by cold and wet. The mules at Middleburg were cured by a very similar dietary provision. Lane stated that samples of colonial oat hay which had been fed to the mules were analysed and showed a considerable deficiency both of phosphate and of lime, as compared with Transvaal oat hay and average British hay. He stated further that he was convinced that this disease, usually called osteoporosis in horses, was identical with the osteomalacia of cattle which was so common in South Africa, and which was generally believed to be due to want of calcium phosphate in the food. This opinion is shared by most veterinary authorities, as reference to standard textbooks shows, but it has been disputed by H. B. Elliott,[9] who has described the disease in plantation horses in Hawaii, it was strongly disputed by Hutcheon in the article cited, and it has also been denied by Sir Arnold Theiler, the present Director of Veterinary Research in the Union of South Africa. These three have all expressed their belief that it is due to an infectious process. Theiler says it is due to an infectious process. Theiler says it is so in South Africa, whatever may be the case elsewhere. We may note that similar

views were once held about infection in rickets, but the infection theory of rickets is now dead.

Hutcheon denied that diet had any influence on the development of osteoporosis in horses, since it appeared " where the food, care, and management were of the best "—an argument which begs the question. Yet in another passage he remarked in connection with an outbreak in a racing stable, that the only apparent influences in operation were high feeding and hard training, and that the animals recovered if they were sent away to the country " and fed largely on green nourishing food."

It is a remarkable thing that osteoporosis is also a disease of city horses, when it is sometimes known as " bran disease." The osteoporosis of city horses has the peculiarity that it disappears when they are sent out to grass and reappears when they return to their old stables in the cities. The city horses suffer considerably from founder, or " laminitis " (inflammation of the bed of the hoof), and this also disappears when they are turned out to grass, and reappears when they return to the city stables. The relatively low calcium content of bran, as compared with its phosphorus content, is now so well known as to need no further emphasis. Phosphorus is relatively high in bran, but if its physiological usefulness, or at any rate, its suitability for storage in bone, is limited by a deficient calcium factor, the tissues could be starved of phosphorus in the midst of plenty.

I wish to note one more piece of information from Hutcheon's article, namely, that the appetite of horses suffering from osteoporosis is generally good, and is sometimes described as " voracious."

The Stijfziekte and Lamziekte or Osteomalacia and Paralysis of Cattle in South Africa.

In the year previous to the publication of his article on osteoporosis of horses, Hutcheon contributed an article[10] to the same journal, entitled " Stijfziekte and Lamziekte, or Osteomalacia and Paralysis." He said it affected cattle principally, but also sheep and goats, " and even horses." It was favoured by drought conditions. *Stijfziekte* (" stiff-sickness ") and *lamziekte* (" lame-sickness ") were regarded as closely related in their origin. The following facts applied to both.

1. Cattle which graze on veld where these diseases prevail manifest an intense craving for bones and all kinds of animal matter. This craving increases as the diseases become more common, and almost ceases when they disappeared.

So intense is this craving at times that cattle have been observed to

kill young lambs and eat them, while every vestige of the carcasses of those that die are speedily eaten up by the survivors.

2. The animals most subject are heifers with first calves, then cows heavy in calf or giving a full supply of milk, and young growing cattle of both sexes. Full-grown oxen are not so liable, and working oxen still more rarely.

In *stijfziekte* there is great pain on walking; the animal adopts a gait like that of a foundered horse, attempting to avoid placing weight on the fore feet; there is enlargement of the joints, especially from the fetlocks to the hoofs, and the outer digit of the hoofs is larger than the inner one. Elevated circular rings are observed round the hoofs, and in some there is an enlargement above the coronet similar to ringbone in a horse. The animal lies down a great deal, and can scarcely be induced to walk in search of food; then signs of starvation appear, and it generally dies of exhaustion, unless successfully treated. *Post-mortem*, there are no indication of disease of the internal organs, but in the articular extremities of the bones, especially towards the feet, there is much congestion. In cases of longer standing the pathological appearances closely resemble those of ringbone and laminitis in the horse. Fractures frequently occur in the bones of the pelvis and thigh. In acute cases, if the bones of the forelegs are sawn longitudinally, the cancellous tissue at the joint ends will be found dark red and filled with gelatinous blood-coloured exudation. The bone-marrow presents a similar appearance. The bone tissue may be readily cut with a knife.

Hutcheon described *lamziekte* as a form of paralysis occurring in two forms, a chronic and an acute. In the former, the paralysis is usually confined to the hind limbs, the animal is capable of raising up its fore-quarters, and will drag itself around in search of food. The appetite is unimpaired. It dies usually from exhaustion, exposure, and neglect. *Post-mortem* appearances of the bones are very similar to those of *stijfziekte*. The internal organs are usually normal in appearance, with the exception that the contents of the third stomach are much drier than natural.

Let me interpose here the remark that the third stomach is the *omasum*, or *psalterium*. It is the one with leaf-like arrangement, whereby it has gained also the name of the "bible" (Greek *βιβλίον*, a book). The disease here described by Hutcheon as *stijfziekte* and *lamziekte* is acknowledged by experienced veterinary surgeons, for example, R. J. Needham[11] and H. R. Seddon,[12] to be the same as that known as "dry bible" in South Australia, as "impaction paralysis" in Victoria, and as "Midland disease" in Tasmania. Something very like it has been described under the name of "Grand

Traverse disease" in Michigan, United States of America, by C. D. Smith.[13] The losses from the disease in part of Australia have been described as "appalling." They are certainly appalling in South Africa.

Returning to Hutcheon's description, he says that in the more acute cases the animal, when first observed amiss, manifests some nervous excitement, with an unsteady and irregular movement of the limbs. If hurriedly driven while in that condition, it will often drop down suddenly and be unable to rise. In very acute cases the animal is completely prostrate from the start; it may lie with muzzle on the ground, dribbling saliva, in a semi-unconscious condition, lapsing into coma, followed by death.

E. Hedinger, Professor of Pathology at the University of Basel, was commissioned by the South African Government about the year 1912 to visit South Africa for an investigation of *lamziekte*. He reported[14] on a detailed study of 52 cases. Microscopically, there was hyperæmia of most organs, especially of the intestines; several cases showed circumscribed hyperæmia in the grey substance of the spinal cord resembling the *post-mortem* signs in tetanus. In the intestines, especially the small intestine, a mucous enteritis accompanied the hyperæmia. In most cases the third stomach (*omasum*) was dry. Microscopically, (1) the muscles showed extensive fatty degeneration, brown pigmentation, and more or less Zenker's degenerations. The intramuscular connective tissue was often œdematous, sometimes infiltrated with leucocytes and red corpuscles, with circumscribed proliferation of the nuclei of the sarcolemma. (2) In most cases alterations were found in the nervous system. Hyperæmia was often seen in the brain and spinal cord. In several cases an early, but very circumscribed degeneration of several fibres of the spinal cord was seen. The principal changes were in the peripheral nerves. In most cases these consisted in enlargement of the lymph spaces between nerve and perineurium, then in œdema of the cells lining these spaces, and further in swelling of the axis cylinders and medullary sheath, and lastly, in a formation of myelinic drops. In several cases a very distinct interstitial neuritis could be noticed. (3) In all cases sarcosporidia or Miescher's tubes were found in the muscular system. It has since been shown by P. R. Viljoen[15] that these are found in nearly all South African cattle over the age of one year. Hedinger had suggested the possibility that the sarcosporidia might have something to do with the disease. A similar suggestion as regards a disease of sheep known in Scotland as "scrapie" was made by T. P. McGowan in 1914.[16] In scrapie the sheep exhibit "trotting" movements, inco-ordination, lameness, paralysis, and

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itching, and the muscles contain sarcosporidia. I refer to scrapie again later.

Sir Arnold Theiler, Director of Veterinary Research, Union of South Africa, has written a great deal on *stijfziekte* and *lamziekte*.[17] On the theoretical side, he has advanced a number of opinions, but to the present critic, the actual evidence brought forward in support often seems dubious and unconvincing. On the descriptive side, his account of the clinical and pathological appearances corresponds closely with that given by Hutcheon, with a few minor alterations and additions. As regards *stijfziekte*, he has described cases in which the bones did not exhibit any serious amount of decalcification. In young animals growth is stunted, they remain small, have a rough coat, and develop a big abdomen. He follows Hutcheon in confining the term *lamziekte* to the paralytic type of disease. Of this there are various degrees of severity; in very acute cases an animal may be well one day and dead by next morning. He does not confirm Hutcheon's *post-mortem* findings on the bones. He describes swelling and redness of the mucosa of the fourth stomach (*abomasum*), some catarrhal enteritis, especially of the small intestine, and sometimes pronounced hæmorrhagic extravasations in the small intestine. In the clinical description it is remarked that in many cases there is bending back of the head and neck, with the head resting on one side; if attempts are made to stretch the head out, it snaps back like a spring. The back may be stretched out straight or bent back, and the animal may be motionless or show spasmodic cramps. In other cases there may be paralysis of mastication and swallowing; the animal desires food and may take it, but be unable to masticate it, and be unable to swallow its saliva. Sensation usually persists; it is only rarely that the sensitiveness of the hindquarters disappears, and usually the animal reacts to pinching or pricking the legs with a needle. It can move the legs, but cannot support its own weight.

Let me again interpose some remarks. It has always been a surprise to me that no one seems to have recognised in these animals—and in many other animals suffering from diseases of various names—that the spastic symptoms described are no other than tetany, and the subtetanic condition, which in children is known as spasmophilia. If the symptoms be regarded from that point of view, and in the light of our more recent knowledge of the relationship of the blood calcium to spasmophilia and tetany, a flood of light falls on the whole field of nutritional disease in animals. As we shall see, the way to interpretation is opened up in a marvellous way, although I do not claim that all difficulties disappear at once.

I return now to Theiler's reports. He made extensive inquiries

amongst farmers, from whom the following opinions and experiences were gathered. Bone-meal feeding is a useful preventive, but opinion was not unanimous. Green feed is beneficial. The disease tends to be confined to certain areas or certain farms. *Stijfziekte* and *lamziekte* are never found on "sweet veld," but exclusively on "sour veld." There is a good deal of it in a region of limestone and dolomite formations. Bone-chewing is always common where *lamziekte* is common. When bone-chewing is not present, there is no *lamziekte*. A change from sour to sweet veld will cure the disease. Cattle brought from healthy areas into *lamziekte* areas do not contract the disease for some time, ranging from a few months to a year. Working bullocks are least susceptible. Heifers in calf and cows with their first calf are most susceptible. Cows in milk generally go down with *lamziekte* eight to fourteen days after calving. Ostriches are affected by a disease in which paralysis of the legs is the striking symptom.

Laboratory Experiments on Lamziekte.

In the Third and Fourth Reports of the Director of Veterinary Research, Union of South Africa, appeared a contribution by Sir Arnold Theiler, H. H. Green, and P. R. Viljoen,[18] describing researches intended to discover whether *lamziekte* was a deficiency disease, evidently meaning an avitaminosis of the nature of beri beri. It is remarked in the introduction that "the superficially analogous disease of *stijfziekte* is not taken into consideration in the paper" since there was no reason to believe that the two diseases, or any of the forms of *stijfziekte*, were of similar origin. The experimental work was begun in 1913 and terminated in 1914, and it should be remembered that the concept of a fat-soluble vitamin, or group of vitamins, had not then been developed. "Vitamin" meant the water-soluble substance we now recognise as vitamin *B*, and whose deficiency induced symptoms of polyneuritis in man, birds, and quadrupeds. The occurrence of paralysis in *lamziekte* had caused suspicion of deficiency of the so-called "antineuritic" vitamin, and the experiments were intended to test the question. Some of these experiments demand special attention.

One series consisted of rice feeding of six cattle, a young bull 2108, grown ox 1928, young heifer 2569, grown calf 2758, cow in calf 3024, cow in calf approaching term 3039. With the rice was given salt and a small quantity of roughage, at first equal to one pound per day of poor veld hay, and later, antoclaved straw, usually about two pounds per day, but cow 3024 in the later months received four to six pounds per day. We may remark that the diet was certainly inadequate in more than vitamin *B*, being deficient in protein, in

calcium, in phosphorus, in the antiscorbutic, and in all three fat-soluble vitamins. The experiment lasted about a year for the animals that survived. In none did any symptom of paralysis occur, and the conclusion was drawn that the requirement for the vitamin must be very small in cattle, and that perhaps the bacterial flora of their own intestinal tract might provide for the necessity, such as it was. As far as vitamin *B* is concerned, the experiment does seem to show that it is difficult to produce the characteristic polyneuritis of *B* deficiency in these animals. The same may be said about scurvy. But the animals showed other symptoms. Gastro-intestinal symptoms were very marked, especially diarrhœa. It may be significant that calf 2758 fractured its femur about seven months after the beginning of the experiment. A point of great interest to me in this experiment was the fact that every animal developed laminitis, which is one of the outstanding features in *stijfziekte*. Theiler and his associates do not seem to have looked at it from that point of view, and record their opinion that it was due to " purely digestive disorder." This is in line with existing orthodox veterinary teaching, but the evidence should be re-examined. It may seem presumptuous in me, but I disbelieve the orthodox teaching. The digestive disorder is, like the laminitis, a consequence, and both are secondary to a common prime cause.

(To be continued.)

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Clinical Articles

An Interesting Split Pastern.

By CAPTAIN J. BELL, F.R.C.V.S.,
Catford, S.E.

A FEW days ago I received an urgent message from the local Territorial Artillery Depot to go at once as one of their riding horses had injured himself in the Riding School and was in great pain.

I found the animal standing holding his off fore foot like a dog holding his paw; he was sweating, breathing hurriedly and looking anxiously; palpation of the pastern and movement of the foot revealed only a slight tissue paper crinkling, but there was much pain on pressure.

As I was positive of a fractured os suffraginis and the horse was about 18 years old, I ordered its immediate slaughter.

Later a *post-mortem* was made. Under the skin I found several hæmorrhagic extravasations and the bone fractured into several pieces. Boiling revealed the fact that there were nine pieces. The upper end four, the lower two, with three small pieces in the middle.

I might state that the horse was wonderfully sound in limb and well preserved for his years (no ringbone, sidebone or spavin, only a small splint each for limb).

SIGN OF OLD FRACTURE.—There did not appear to be any new bony deposit indicating old fracture, and the smoothness of two or three of the pieces was consistent with the fact that it was about four hours between the accident and death.

From inquiries I found that the horse broke away from the attendant in the school and capered and galloped about twice round, when he pulled up suddenly. The School has a beautiful surface, 12 to 14 inches thick, of peat, tan and sand, so I can only surmise that the horse struck the wall in coming down from the rear or turning at the corner. At any rate a riding school is about the last place in which one would expect an animal to suffer such an injury.

In my opinion there was a little rarefaction of the cancellated bone tissue showing, but whether this was the result of too much boiling or not I was not quite sure.

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Treatment for Intestinal Parasites in the United States Army Horses.*

WHAT might be termed a campaign against internal parasites of equines has been going forward at the three Army remount depots beginning last fall. The principal host suspected was the colt, and he was therefore the one selected for the first attack. Many of the colts were pot-bellied, their coats stared and their appetites varied, while quite a number were rubbing their tails and otherwise manifesting unthriftiness.

The first authentic data that this office has been able to procure is now being assembled and, while it is too early to report any definite conclusions, it is believed that a short synopsis of what has developed would be of interest to readers of the " Bulletin," and it is hoped to publish such data in an early issue.

With a view to further experimentation, it is desired that all veterinary officers serving with troops select a part or all of the " old chronics " (which are always with us) such as those with " recurring colics," " chronic indigestion," " poor doers," etc., and treat them for internal parasites. The 12- to 14-year-old animals, so many of which are being condemned for " senility " and which probably are unthrifty and pepless should also be *suspected* and treated for parasites.

For the treatment of Bots the approved period is after the Bot fly has disappeared, and as this occurs with freezing temperature it can be determined on this basis. The treatment itself consists of withholding all food for from 18 to 24 hours, at the end of which time six fluid drachms (24 c.c.) of carbon bisulphide for a 1,000 pound horse is given in capsule. A purgative is contra-indicated either before or after the administration of the carbon bisulphide. In view of the fact that many yearlings at the remount depots have in the past few months received 24 c.c. of this agent, with no ill effects, it is thought that this quantity can safely be increased in instances where the case in hand might suggest it, and for animals weighing appreciably more than 1,000 pounds, the dose undoubtedly should be increased even up to 30 c.c.

The use of the stomach tube in the giving of the medicine has become very popular at all of our remount depots. A small tube of smaller dimensions than the issue tube has been procured and is proving ideal even for the weanlings. There is one possible objection to the stomach tube in giving the carbon bisulphide in that the volume is comparatively small, and it is found necessary to follow up with a small quantity of water in order to insure the full dose of medicine

* In the Veterinary Corps " Bulletin " of the United States Army. March 14/28.

getting to its destination. There is the possibility of sufficient dilution to inhibit the full effectiveness of the carbon bisulphide. It is believed that experimentation along the lines as herein described will result in valuable information relative to the subject.

The carbon bisulphide is practically 100 per cent. efficient in the treatment of Bots when given as in the foregoing. They are voided over a period of 17 days, many ascarides being expelled at the same time as a result of the same dose. In the treatment of other varieties of internal parasites which infest the equine species, the period of fasting is increased to 36 hours. In this connection, it might be stated that no ill effects were discernible from these fasting periods in the incidence of colts—weanlings to three-year-olds.

After the fasting period, 16 c.c. of oil of chenopodium for each 1,000 pounds of live weight of the animal, in one quart of pure, raw linseed oil is given through the stomach tube, adding one dram of chenopodium for each additional 250 pounds. Subsequent treatments with oil of chenopodium should only be given after detecting the larvæ or parasites by microscope or otherwise in the droppings of the animal. Wherever possible a check should be held out and a full and detailed report made to this office, such a report to include clinical symptoms, weight and age of animal, condition of flesh, appearance of coat, medical history, kind and dosage of medicine used, method of administration, results obtained, kind of parasite passed, and the approximate number thereof expressed as "none," "few," "many," etc.

An Interesting Case of Filaria Immitis in a Dog.

By W. S. LORNIE, M.C., M.R.C.V.S., and
J. M. CUMMINE, M.R.C.V.S.,
Perth.

SUBJECT.—A four-year-old Airedale dog.

HISTORY.—The animal was bought as a pup in Sydney, Australia, in 1925. From here it went to Manilla, where it was said to have contracted "mange," being treated with arsenic and oil. It was eventually cured when it came to England in 1926. The usual six months were spent in quarantine in London, and here again a skin disease broke out. Later the animal reached a dog's home in Edinburgh, where it again was treated for mange and became temporarily cured, after a further six months' treatment.

It was admitted to this hospital in November, 1927, and showed the following :—

SYMPTOMS.—The patient was in a very debilitated condition, with

an erratic appetite, and vomition was a common occurrence. Salivation was profuse. The eyes had a purulent discharge, and the skin seemed to be affected with a chronic irritation, but with no sign of " mange," or any skin parasites. The heart had a very fast and irregular action through the whole course of observation and treatment.

DIAGNOSIS.—It was suspected that the animal was suffering from some blood disease, but no trace of any parasites could be found on microscopical examination of blood smears.

In spite of treatment the animal became gradually weaker and died about 14 days after admission.

POST-MORTEM.—The total lack of fat was conspicuous. A slight gastritis and enteritis were present. the heart was definitely enlarged and on opening it two female filaria, each 25·4 cms. long were seen coiled up round the chordæ tendineæ of the right ventricle. The lungs and other organs were all examined carefully, but no more filaria were found.

Malposition of the Right Testicle of a Dog.

By J. F. DONALD TUTT, M.R.C.V.S., F.Z.S.,
Winchester,
AND
TOM HARE, M.D., B.V.Sc., M.R.C.V.S.,
Professor of Pathology, Royal Veterinary College, London.

A pedigree black cocker spaniel, aged eight years, presented a firm oval subcutaneous tumour on the right side of the penis. No testicle was present in the right scrotum, though a normal testicle

Photograph of Malplaced Testicle, Bisected.

was found in the left scrotum. The tumour was deemed to be a misplaced testicle, and was removed by simple dissection. (J.F.D.T.)

The owner stated that the dog had served several bitches, which with one exception had produced good litters. He had only recently observed the tumour.

On section, the tumour proved to be a slightly hypertrophied testicle, its normal tunica albuginea being surrounded by adipose tissue. Smears made from the juice scraped from the freshly cut surface of the testicle revealed numerous immature sperms; only an occasional adult sperm was found in each field.

An Interesting Strangulated Hernia.

By GUY SUTTON, F.R.C.V.S.,
London.

STRANGULATED hernia is sufficiently rare in our patients to merit record.

Some months ago a client sought advice with regard to a chow bitch who had developed a swelling in her groin. It was about the size of a Jaffa orange, irreducible, firm to the touch, though apparently painless.

The owner said he first noticed it a week previously. The bitch had not been sick or refused food. From examination I received the impression that the herniated uterine horn contained a fœtus, the owner declared this to be impossible as although the bitch had recently been on heat, he was positive she had not been mated. He was sure the swelling was not in existence a fortnight ago and did not think it had altered in size since he first noticed it. The bitch was a show specimen and he wished to have the tumour removed.

Under anæsthesia further efforts were made at reduction, but the mass could in no way be reduced. After the usual preparation the skin was incised and reflected back to the abdominal wall surrounding the pedicle. The hernial sac, a deeply congested looking mass, was freely opened by an incision over its curvature exposing the contents. Omentum having a much shrunken and shrivelled appearance and a deeply jaundiced colour firmly adherent to the margin of the aperture.

A ligature of gut in the form of a " clove hitch " was placed around the pedicle close up to the abdominal wall and drawn tight. The sac and its contents were then removed and the skin sutured over the stump. The bitch was kept confined in kennel for the next ten days and recovery was uninterrupted.

Messrs. Stainton & Ollerhead gave me their help in carrying this through.

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Prolapse of the Rectum.

By G. MAYALL, M.R.C.V.S.

For a long time I have taken a somewhat special interest in this condition. It is one which the general practitioner has frequently to deal with and from reports and experience I consider that we do not get any percentage of successful results that we can congratulate ourselves on. Of course there are conditions causing prolapse that it is impossible to remedy by local and external measures, but in not a few cases the breakdown of operative interference is frequently evident at the place of operation.

A short time ago I came across a new method of treatment, and I am anxious for the sake of surgical interference and reputation that it should be tried out by practitioners. I have dealt successfully on one fox terrier pup by the method and this is the only case so far on which I have had the opportunity of trying it. One case proves nothing and I am desirous that practitioners should help by recording the results of the following method of procedure given by Carpenter and McDonald in *The North American Veterinarian*, August, 1925, at page 41. The method is :—" Scrape off the infiltrated (epithelial) layer of the mucous membrane down to the basement membrane with a scalpel and thus thinned down, the protrusion slips back into place spontaneously as fast as the thinning process proceeds " and fortunately, the authors announce, never to prolapse again.

They do not mention the use of any local anæsthetic, but quinine and urea hydrochloride would seem to be a very useful application to precede the scraping.

A Cat Case.

By G. MAYALL, M.R.C.V.S.,

Bolton.

On October 22nd, 1927, I was called to a tortoiseshell tabby cat, eight years old. I found a well-nourished and lively cat with swellings of each mamma and the teat protruding somewhat. The swellings were greyish in appearance, semi-transparent and about the size of marbles. I prescribed some weak belladonna lotion and laxatives, and the owner considered that the cat improved somewhat.

On April 11th, 1928, I was informed by the owner that the swellings on the abdomen had all coalesced and that a big bulging was there, almost reaching the ground, and that the neighbours were commenting on its appearance. He asked me to take her in and see what could be done. I found a very big swelling, soft on palpation, and fluctuating and with the cat on her back could feel rather hard, misshaped and

enlarged mammary glands running along the under surface of the abdomen in the depths of the swelling. Everything seemed to be outside the abdominal cavity.

The tabby was chloroformed in the afternoon of April 11th, the swelling was painted with tincture of iodine and incised along its entire length, and a good half pint of yellowish serous fluid evacuated; two ounces of glandular tissue was taken away from the abdominal wall and this made quite clean and level. There was no great amount of hæmorrhage and the tissue was attached by two or three pedicles. An elliptical piece of skin was incised and the wound closed with silk sutures. The cat came round quite well after the chloroform, but dribbled from the mouth for a day or two. Glycerine and medicinal paraffin soon set this right. On April 13th she took a little milk, and on April 16th a little fish and from the 20th meat (raw and cooked). The wound was dressed with plasmul powder and occasionally touched with tincture of iodine. A piece of clean linen with some duo adhesive dressing at the edges helped to support the wound and keep the powder in contact with it. The cat has done well and as she is a great favourite of the owner he is very well satisfied. This is the second case I have seen in the cat where there have been these semi-pellucid swellings containing fluid in connection with each teat. The other was over two years ago, but I only saw and prescribed for this cat once and never heard how she went on afterwards. I do not find any mention of the condition in the cat books I have.

An Abnormal Calving Case.

By ABRAHAM SCOTSON, M.R.C.V.S.,
Market Rasen.

SUBJECT.—Lincoln red heifer.

Sunday, 25th, 10 a.m., telephone call to a heifer calving. On arrival I found the heifer quite normal and eating hay; no signs of any flow of milk or relaxation of the pelvis, and had it not been for two or three inches of dark and shrivelled placenta hanging from the vulna, I should not have handled her.

Having fastened the animal securely and dressed my hand with a little belladonna ointment, I found that it was only possible to introduce three fingers into the vagina; but by manipulation I at last succeeded in passing my whole hand, which came in contact with what I at first thought was a tumour. As I could feel no attachment, I took a firm grip and was surprised to find a completely formed calf which was mummified and only about one-tenth the normal size. On further exploration I found the uterus intact with every symptom of there being another calf within.

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The calf taken away was about 6 in. long, the head being almost the shape of a duck's head with bill attached. It weighed only about 10 ounces.

The owner told me that the heifer had been served by the male twice at an interval of six weeks, and her time was up to calve from the first service on the following week (about April 6th).

Query: How long had the calf been outside the uterus?

Abstracts

Report on the City of Luxemburg Slaughter-House for 1926.*

An excellently edited report for 1926 on the Sanitary Service of the Public Slaughter-House for the City of Luxemburg has been produced by its Director, Dr. Spartz, Veterinary Surgeon to the town. This report is purely statistical, comprising 40 pages of figures and tables, and although the compiler has refrained from criticism, the following interesting conclusions have been drawn therefrom.

The post-war period has shown a remarkable increase in the volume of work dealt with: from 1919 to 1926 this increased 1,123·5 metric tons live weight, or 76·45 per cent. There were considerable imports of animals from Belgium, and exports of fattened pigs to the Sarre.

Tuberculosis is the most striking of the diseases mentioned; 749 adult bovines out of 2,298 slaughtered were found tuberculous, i.e. 32·5 per cent.; 59 calves out of 8,190, i.e. 0·72 per cent., and 160 pigs out of 9,374, i.e. 1·70 per cent. Cows were far more often affected than bulls or oxen, and the majority were of Dutch stock, but since no figures are given as to the total number slaughtered from each stock it is impossible to say which stock is most affected. The period 1917-1925 has shown an increase of tuberculosis, which is particularly noticeable in the case of the calves; whereas in 1905 only 0·04 per cent. of the total number slaughtered were registered as tuberculous, in 1925 this had reached 0·85 per cent., 21 times as much.

Eighteen cows were found to be suffering from various tumours—fibroma, cancer, etc.

Only 19 carcasses were seized in entirety, of which five were tuberculous; but 85 carcasses or quarters were put up for sale as

* Reviewed in the *Bulletin de l'Académie Vétérinaire de France*, March 1928, p. 81.

condemned meat, owing to tuberculosis, hydroæmia, and cases where urgent slaughtering was resorted to to cut the loss on animals suffering from pneumonia, tuberculosis with tuberculous enteritis, etc. Twelve thousand four hundred and nineteen lungs, livers or kidneys and 223 heads, were also seized, to which must be added 1,720 cases where localised lesions led to the retention of the parts affected. The latter were mainly due to parasitic disease, tuberculosis and abscesses, and included 400 pounds of material in connection with cases of mammitis.

Dr. Spartz's report is excellent, but its interest would have been enhanced had he added his own observations to the figures.

Appearance of Contagious Pleuro-Pneumonia in Cattle in Japan.*

ALTHOUGH contagious pleuro-pneumonia in cattle has been included in the Infectious Diseases in Stock Act, this country had fortunately been quite free from the disease till the second quarter of the last year (1924). In September, 1924, three cases of the disease were discovered among Mongolian cattle imported from Dairen, China, at Yokohama Animal Quarantine Station, where the disease was readily stamped out, the infection not being introduced into the interior of the country. On that occasion Sadashi Ono, the animal quarantine officer, carried out some experiments on the disease, the results of which were reported in the March issue of this Journal (1925).

In the latter part of May, 1925, cases of this disease appeared on a dairy farm in the City of Osaka and then the disease spread not only to the vicinity of the farm, but to five neighbouring prefectures. In the law in force there have been no provisions relating to slaughtering of animals exposed to infection, although all the affected animals may be slaughtered with compensation (one-third of the value of the slaughtered animal). With the hope that the disease might be successfully eradicated by taking most strict measures at the time of introduction in such a country infected as this country, an Urgency Imperial Ordinance was issued on July 2nd, as a result of which all the exposed animals may also be slaughtered, the compensation being four-fifths of the value of the slaughtered animal.

According to the investigations of the Ministry of Agriculture and Forestry the return of the disease (May to August 19th) is as follows:—

* *Journal of the Japanese Society of Veterinary Science*, Vol. IV, No. 3.

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Prefecture.		May.	June.	July.	August	Total.
Osaka ..	Affected cases died or slaughtered	32	31	18	5	86
	Exposed cases slaughtered	—	—	514	253	767
	Total	32	31	532	257	853
Kyoto ..	Affected cases died or slaughtered	—	3	—	1	4
	Exposed cases slaughtered	—	—	—	23	23
	Total	—	3	—	24	27
Shiga ..	Affected cases died or slaughtered	—	20	3	2	25
	Exposed cases slaughtered	—	—	—	31	31
	Total	—	20	3	33	56
Hyogo ..	Affected cases died or slaughtered	—	1	3	2	6
	Exposed cases slaughtered	—	—	139	—	139
	Total	—	1	142	2	145
Okayama ..	Affected cases died or slaughtered	—	6	4	—	10
	Exposed cases slaughtered	—	—	11	—	11
	Total	—	6	15	—	21
Kagawa ..	Affected cases died or slaughtered	—	—	4	1	5
	Exposed cases slaughtered	—	—	12	—	12
	Total	—	—	16	1	17
Grand Total	Affected cases died or slaughtered	32	61	32	11	136
	Exposed cases slaughtered	—	—	676	307	983
	Total	32	61	706	318	1,119

It is generally believed that the disease was probably introduced by cattle imported from Korea where the occurrence of the disease has been reported since a few years (14 cases in 1922, 382 in 1923, 260 in 1924, 9 from January to August, 1925).

Result of Castration in Horses Performed under the Supervision of the Japanese Government.*

ACCORDING to the latest investigation of the Ministry of Agriculture and Forestry the number of horses castrated and bad sequelæ and accidents occurred in them during the last two years are as follows :—

* Abstract from *The Journal of the Japanese Society of Veterinary Science*, Vol. IV, No. 3.

1.—Number of Castrated Horses.

	Number of Castrated Horses.	Manner of Securing the Horse.			Modus Operandi.		
		Standing Position.	In Travis	Recumbent Position.	Emasculation.	Emasculation with the aid of Sand's Forceps.	Torsion.
1923 ..	31,992	25,707	6,050	235	27,819	4,004	169
1924 ..	29,969	23,349	6,482	138	25,596	4,117	256
Total ..	61,961	49,056	12,532	373	53,415	8,121	425
Percentage	—	79·17	20·23	0·60	86·21	13·11	0·69

2.—Bad Sequelæ and Accidents in the Castrated Horses.

	Peritonitis and Septicemia.	Funiculitis and Fistulæ.	Tetanus.	Serious Hæmorrhage.	Prolapse of Intestine	Fractures	Total.
1923 ..	23	2	7	1	8	7	48
1924 ..	17	3	11	1	12	5	44
Total ..	40	5	18	2	20	12	97 (0·12%)

Our Fraternal Ancestor.*

There is nothing transpiring in veterinary circles to-day that is more impressive than the struggle of the British veterinarians to rehabilitate the physically deteriorated Royal Veterinary College of Camden Town, London. Let it be known, however, that there has been no deterioration in spirit, notwithstanding the lack of governmental support such as veterinary colleges in other countries require to carry on during these trying days of medical education and vexatious change in veterinary practice.

* The *North American Veterinarian*.

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As expressed by Principal Hobday in an address before the Central Veterinary Society, "Is it not an anomaly—a curious anomaly—that in England, the foremost animal-loving country in the world, the one country, too, to which all other countries send for the best pedigree stock of all kinds, veterinary science, the one science which is best fitted to cater properly for the preservation of health, should be so scandalously neglected?"

We realise the possible unpopularity of a sympathetic interest in a matter of this nature coming from abroad to colleagues of a nation which has so much right to be proud of its position in the world of science and animal husbandry as Great Britain. But, claiming the right to express an emotion concerning the plight of a forefather, we risk approving the prevailing criticism. The situation *is* regrettable, and it concerns, not only England but all of the English-speaking nations, particularly the United States and Canada where the Royal Veterinary College of London has ever been regarded as the distinguished progenitor of their respective veterinary services, and which have shared most the fruits of its achievements and standards. In these two countries, where public support of veterinary education is in its infancy—probably on probation—there is every reason for mutual anxiety, for as goes the forefather, so may we.

To be more explicit, the veterinarians of England are waging a battle for governmental support of veterinary education and research allied thereto. Some ground has been gained. The Treasury has promised a grant of $180,000 with the reservation that this sum be met dollar for dollar from outside sources. Attempt is being made to meet this conditional appropriation. "Surely there must be 100,000 sporting men and women in England who will give one pound apiece to such a worthy project and for the sake of the sick animal which is unable to take care of itself," as Principal Hobday continues his plea for funds, indicates the crux of the situation without the need of additional comment.

All things considered, it is evident that the situation in England at this hour is not different than ours would have been had a change not been brought about less than a decade ago when the private colleges bowed to the inevitable. In fact, the picture of their forefather, born in 1793, struggling for existence at the age of 135 years can only be looked upon as an outward expression of what would have happened with us under the conditions which came upon the veterinary profession like a whirlwind and threw its smooth running machinery out of balance about ten years ago. Physical deterioration could not have been escaped save by closing up and leaving the matter of veterinary education to the states. It is to the credit of the British

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veterinarians that the Royal Veterinary College should have stood so long without substantial financial assistance, and inasmuch as our departure is yet to be well enough patronised to justify the expenditure in the minds of those who compute only the number of students in making their calculations the insecurity of the situation in England is a warning to keep our diminishing forces united and committed to the policy of providing an attractive status for the output of our veterinary colleges. Otherwise veterinary education which is only 150 years old may turn a sharp corner.

Abstracts of Current Literature

Jirina, Dr.—A Case of Traumatic Œsophagitis in the Horse.—*Präger Archiv. f. Tiermed,* Dec. 15th, 1927.

THE author had the opportunity of carrying out the operation for fistula of the œsophagus in the horse, which occurred as the result of a kick. After removal of necrotic pieces of skin the gullet showed itself as big as a child's fist dilated with pus-covered and evil-smelling remains of food. The wound was about seven-eighths of an inch long and two-thirds of an inch broad. As soon as the pathological tissue and the remains of the food were removed the general condition of the horse improved. It held its neck normally, had a good appetite, but food and water escaped from the wound. On account of infection this wound was not sutured, but healed slowly, so that food and water were taken better. A fistula, however, remained, from which a weak stream of water escaped when drinking. After total extirpation of the callous and fistulous part of the œsophagus the œsophagus was sutured by two successive operations at first with a negative and then only partially successful result in so far that in spite of twice suturing saliva and water escaped. Finally, however, after six weeks healing occurred. Doctor J. comes to the conclusion that through suturing healing was only delayed and that it would have been better merely to have removed the callous tissue.

Jaros, Dr.—The Use of Physiological Salt Solution in Chronic Diarrhœa of Foals.—*Präger Archiv. fur Tiermed,* Dec. 15th, 1927.

IN Neuhof in Bohemia outbreaks of diarrhœa in foals, a few months old, occur annually and are very obstinate and recurrent. In two foals which had been treated with almost all possible remedies and with only transient improvement, Dr. J. applied at one day intervals intravenously 200 ccm. of a 0·85 per cent. sodium chloride solution,

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with rapidly successful results. After the first injection the diarrhœa ceased, after the third the inordinate thirst also and after the second injection the diet was increased and normal food taken. Only in one of the two foals diarrhœa occurred again after a week, but it was easily controlled and cured with ordinary therapy. Dr. J. is conducting further trials with physiological salt solution in diarrhœa.

Dr. Pietzsch.—Urea for Warts.—*Prag. Archiv. f. Tiermed*, Dec. 15th, 1927.

THIS is a very old treatment for warts. Its full effect may be produced with 50 per cent. of urea or urea and water in equal proportions. On several horses the author had opportunities of trying it and he succeeded in causing the disappearance of the warts by subcutaneous injections in their region and no visible cicatrix remained.

Bouchet.—Alcoholic Intoxication in Cattle.—*Bulletin de l'Académie Vétérinaire de France*, March 1928, p. 85.

The author points to the frequency of bovine intoxication in Normandy and other localities where cattle have access to large quantities of ripe fruit, particularly apples and pears when these have been collected in heaps and allowed to get heated. Soon after eating such fruit the animal staggers, the head droops, the eyes are dull, and finally the animal falls down into an unnatural attitude which it makes no effort to change. Recovery takes place normally in 24 to 72 hours, and is assisted by administering strong coffee and ammonium acetate.

According to the author, alcoholic fermentation takes place in very ripe apples, and this is favoured by ingestion into the rumen, leading to true alcoholic intoxication. This view is shared by the Director of the Société Pomologique de Caen, Mr. Warcolier, who finds that very ripe apples, if allowed to get heated, undergo some alcoholic fermentation, the alcohol thus produced persisting for some time without undergoing acetic fermentation.

The author extends this view to explain a case of alcoholic intoxication of a heifer which had eaten large quantities of sugar-beet described by himself in the Bulletin in November, 1927.

Frese, Dr., of Greifenhagen.—Case Reports.—*Berliner Tierarzt Woch*, Mar. 9th, 1928.

CONTUSION OF THE BRAIN.

A RACEHORSE was being led out, reared and fell on the left zygoma and orbital rim. On my arrival it was down—blood running from the nose. After a time it got up, tottering in the hind part. Next day the horse drank in gulps, ate some greenstuff, but chewed badly. Two following days head held slanting as in torticollis. Advancing

improvement. Patient ate a bundle of greenstuff and drank some linseed and oat mucilage. Head depressed. Vision to the left and down. Locally no swelling and pain in the region of the skull and cervical vertebræ. On backing him about very sudden pain and then staggering. Lies down at night. Next two days presses to the left, increased respirations, sweating. Box very warm. Pupil dilated, horse sees nothing, does not react to hand movements, stumbles about, makes circular movements. The head is often held straight. Next day makes weaving movements, but obliquely up to the right and down to the left and up to the left and down to the right with the head. Is over sensitive to flies and grooming. Collapses, gets up again and drinks. Collapses and runs the head against the door. Dies in the night. Treatment cooling compresses and fomentations, plenty of air, arecolin injections.

Post-mortem.—Cupful of blood above the right cranial hemisphere in the coverings of the brain and their region. In the cortex itself small pin point hæmorrhages. Cranial cavities and sinuses of the nose filled with clotted blood.

In this case it is perhaps possible that an operation might have saved the horse.

Colic in a Cow as a Result of Perforation of the Uterus.

Cow stood quiet with the hind legs extended backwards. No rumination. Eating a little hay and straw. When trying to catch her she jumped a high hedge and subsequently showed the same position as at first. A few days later she again jumped the hedge. Temperature, 38·4° C. Took some straw. Died in the night. Hæmorrhage as a result of rupture of the uterus by the calf. One foot of the calf passed through an old tear in the uterus into the abdomen. At this point there was old connective tissue proliferation. The old perforation had probably occurred some months previously.

Root in the Roof of the Mouth.

A cow was stated to have swallowed a turnip. Pharynx and œsophagus were clear on passage of the probang. Tympanitis. Punctured with trocar and canula. On the next morning the attendant on drawing out the trocar noticed blood flecked foam coming away. Second day no change. Third day temperature 38° C., pulse 100. Eyes sunken, anxious expression. Dung black and thin pulpy. Slaughter on the fourth day. Turnip as big as one's fist stuck at the upper half of the soft palate, bad smelling. Moderate inflammation of the region. I took it that the root was at first swallowed, then by a violent anti-peristaltic wave was rolled back again and got caught fast at the upper half of the soft palate.

Dr. Harnach.—Attempts at Vaccination Against Tuberculous Infection by means of "B.C.G." Vaccine of Aviary Origin.—*Revue Générale de Médicine Vétérinaire*, March 15th, 1928.

THE author has evolved a method, which, after thoroughly testing, he pronounces as an effective method of protection against infection through the digestive tract, which is the common mode of natural infection. He summarises his conclusions as follows :—

(1) The vaccine injected under the skin in 2·5 milligram doses for chickens under 11 days old, or in 5 milligram doses for healthy adult hens, is supported without any reaction.

(2) In most cases a dose of 5 milligrams by intra-muscular injection in adult hens was as easily supported. In one case where death took place 31 days after injection no tubercles were found.

(3) Doses of 10-20 milligrams by the digestive tract were found too heavy for two-day-old chickens, but some of these were vaccinated with 20 milligrams. Those that died between two and 15 days after, and those killed 30 days after showed no tuberculous lesions.

(4) The vaccine circulates through the parenchymal organs, but it has not been detected in the eggs laid during the 15 days following the vaccination, whether the latter was subcutaneous or intra-muscular; rabbits and guinea-pigs injected with the contents of these eggs have reacted to the intradermal test with tuberculin after three weeks.

(5) The adult hens and chickens which have not reacted to tuberculin become locally hypersensitive to avian tuberculin five weeks after the vaccination with the "B.C.G." The temperature curve is not modified.

(6) The production of anti-bodies in the fowls vaccinated has been proved by the Calmette-Massol method.

(7) Satisfactory results are obtained in the precipitation of sera of vaccinated hens by using as antigen the filtrates of the avian tuberculous culture.

(8) The fowls vaccinated with avian "B.C.G.," whether subcutaneously or intra-muscularly, or even by the digestive tract, are rendered completely immune with regard to infection with two milligrams of virulent avian culture administered by the digestive tract; no tubercle was found after from seven to nine weeks. Controls were all infected by the same treatment. The vaccinated fowls even resisted infection after four to six weeks' cohabitation with tuberculous fowls.

(9) The vaccinated fowls were not rendered immune to intravenous infection with 0·1 milligram of virulent culture after seven to nine weeks.

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Instruments and Appliances.

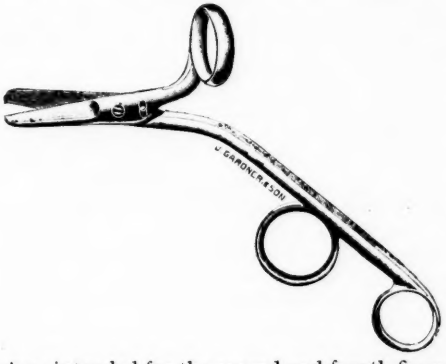
A PATTERN OF SCISSORS FOR USE IN SUTURING.

By A. SAVAGE.

Class "D," Royal (Dick) Veterinary College.

THE surgeon who is fortunate enough to work under ideal conditions has a trained staff at his elbow—one which anticipates his wants and literally co-operates with him. One minor form of this assistance is evident when he is engaged in placing a line of discontinuous sutures. As fast as he draws silk or gut through the margins of the wound, it is cut into convenient lengths for tying, either as a matter of course, or at his merest nod. The result is nice work quickly done.

In the veterinary field, however, one is usually handicapped by lack of such help, and sometimes there are very long wounds to unite. Under these circumstances, the procedure in question becomes largely a tedious repetition of picking up and putting down scissors. Frequently too, as at the end of an operation, when the animal is about to emerge from anæsthesia, the operator is working against time. The result is not always satisfactory. Either the workmanship or the worker's store of nervous energy is apt to suffer.



To economise time and to avoid the repetition of picking up and putting down scissors of the usual kind, the pattern herewith illustrated was designed. These scissors are for use in the right hand. Their particular features are (1) a long branch with two rings intended for the second and fourth fingers, and (2) a short branch with a diagonally-placed ring into which the thumb may be slid easily. The blades are short; a stop prevents their being opened unduly wide.

Once the fingers are in their proper positions, the scissors lie comfortably in the palm of the hand. No conscious effort is necessary

to retain them. The thumb and fingers are free to tie sutures. A momentary extension of the former brings the cutting edges into action after which they may be forgotten until again required. When properly fitted to a skilful hand, the presence of these scissors does not appreciably affect the simultaneous use of a needle holder.

I am indebted to Messrs. Gardner & Son, of Edinburgh, who kindly worked out the details of this pattern at my suggestion.

Reviews

The Prospective Development of Peru as a Sheep-Breeding and Wool-Growing Country. By ALDRED F. BARKER, M.Sc. (Professor of Textile Industries, University of Leeds, England). Illustrated with photographs taken by Colonel J. Stordy, C.B.E., D.S.O. Pp. 174 and 93 illustrations.

THIS publication comprises a report to the Peruvian Government bearing on Peruvian flocks and Peru as a sheep-growing country.

The outstanding item of interest to the veterinary profession lies in the fact that the photographs represent the work of Colonel Stordy, formerly Chief Veterinary Officer of Kenya Colony.

This gentleman did much to help Prof. Barker in his wanderings in Peru and others parts of South America when in search of information relative to methods for the betterment of the ovine population of Peru.

A portion of the work is given over to the consideration of the characters of the flocks at present existent in that country.

In 1920 a scheme was formally inaugurated under President Leguia, and Col. Stordy was appointed with the object of developing a model school upon the Andean heights at 12,900 feet above sea level.

The object was to concentrate upon experimental work, so that the evolution of Peruvian sheep might be so controlled, as to make the wool yield correspond to the standard required by European and American manufacturers.

Some 20,000,000 acres of land are available for sheep farming.

The work deals with the natural herbage of the country and gives an insight into the life of the native population.

It is noted that the fleeces of the existing sheep only yield 1¼ lbs., whereas experiments show that with pedigree or half-bred imported rams the yield can be brought up to 3–5 lbs. per sheep.

Much space is devoted to English breeds of sheep and their respective value for crossing purposes; many technicalities relating to wool are of chief importance to the sheep breeder and wool merchant.

Recommendations for future experiments in cross breeding make interesting reading for the sheep farmer.

Various appendices have a bearing on the complexities of the wool trade.

The low fertility of Peruvian sheep is striking and one notes the improvement resulting from the admixture of blood of English rams.

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The book is well turned out and carefully edited; the photographs are excellent and some of the Peruvian scenery invites a visit to that country.—A.R.S.

Veterinary Materia Medica. Issued by Messrs. PARKE, DAVIS & Co. Pp. xix+144. Sixth Edition, 1928.

THE sixth edition of this well-known booklet has made its appearance, and Messrs. Parke, Davis & Co. are to be congratulated upon their success in producing a useful little work of reference which continues to receive further useful additions with each succeeding edition.

The first section consists of a concise therapeutic index, and includes a list of abbreviations, which, however, is not noted in the general index at the end of the volume. This omission is to be regretted, since the subsequent explanation of the same abbreviations in the text and in foot-notes (e.g. on page 81 *et seq.*), would thus be avoided.

The succeeding portions are devoted to descriptions of Messrs. Parke, Davis & Co.'s veterinary preparations and their applications—vaccines (divided, American fashion, into "vaccines" and "bacterins"), and pharmaceutical products for use internally and externally, including hypodermic injection and anæsthesia. A veterinary posological table and tables of the normal temperatures, pulses, and rates of respiration of animals are appended, but the last two will not meet with the use they deserve, for the reason that no reference to them is to be found in the index or elsewhere.

The index, which has been tested in various ways, appears to be very complete, save for the omissions alluded to above. The work is well printed, and has been compiled with care and accuracy.

Grundriss der Clinischen Diagnostik der inneren Krankheiten der Haustiere. (Outline of the Clinical Diagnosis of Internal Diseases of the Domesticated Animals.) By PROFESSOR DR. B. MALKINUS. Tenth edition revised by Professor Dr. T. Oppermann. Pp. 243, 66 figs. in the text, 1 coloured plate. 1928. Max Janecke, publisher, Leipzig. Price: stitched, 8.60 Reichsmarks; bound, 9.50 Rm.

THIS is a valuable book to enable the practitioner to concentrate on the main facts to be considered in arriving at a correct diagnosis of disease. If he follows out the guiding lines given, he will seldom err or at any rate, he will know that he has not left much scope for error. Acknowledgment, however, is given to the fact that one cannot always be exact for we note that a diagnosis may be a certain, a probable and a possible one.

In the curative and repressive measures necessary in veterinary practice everything depends on right diagnosis. Only by the methodical training of students is it possible to equip a man to hold his own in this matter in the field. This revised work of Malkinus's presents the varied considerations of the subject in concise and careful form, and represents the collected and up-to-date results of veterinary experiences. The aids to clinical diagnosis given by bacteriological examination and diagnostic injections are fully described. A special section is allocated to

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an examination of the blood, and is accompanied by a coloured plate illustrating 20 variations of blood corpuscles.

The vogue that the book has had in Germany is declared by the fact that this is the 10th edition, and Professor Dr. Oppermann's revision has resulted in the addition of the latest and most modern information to its pages.

Very often veterinary surgeons in this country are sceptical as to the exact diagnosis of many cases of heart trouble in animals, and perhaps more so as to the prognosis; and the lines on the subject may enable some of us to go further than a declaration of functional derangement or organic disease.

The procedure for the examination of the supramammary lymph glands is given as follows: "Standing behind the animal one seizes the skin with the one hand at a lateral surface of the udder, and lifts it up, while the other hand palpates the gland. In tuberculosis of the udder the regionary lymph gland is enlarged, overhangs the udder and shows pea-sized nodules."

We looked curiously in the book for an unfailing diagnosis for Borna disease or grass disease, but did not come across it. The most recent view of Dr. Ariess of Rottenbuch (Upper Bavaria) is that the disease should be called Encephalopathia Endemica* and that an examination of the cerebro spinal fluid will be the best aid to the practitioner as regards prognosis, but how to obtain this fluid by a simple and harmless surgical procedure seems to be the puzzle.—G.M.

Die Bedeutung des Exterieurs und der Konstitution des Pferdes für seine Leistungsfähiglneil. (The importance of the exterior and constitution of the horse for its mechanical power.) By BERGER ROSIO. Pp. 181. Richard Schoetz, publisher, Berlin. 1927. Price 9 Rm.

THIS is a research by district veterinary surgeon B. Rosio, of Amal, Sweden, which he has carried out during three years in his own country, Germany and America. It deals with detailed measurements of different structures of a large number of horses. All the results are given in tabular form. From these numerous formulæ have been drawn up. The last few pages are devoted to the American dynamometer which is erroneously called "the pulling hasting machine." There are two photos of this machine and a table showing the details of the exterior, the weight, and mechanical power of 50 heavy American working horses. To those concerned with the conformation of the horse in relation to the mechanics of draught, the work will prove of considerable interest and value.

WE have just received a copy of the new Season's Catalogue for Game Foods issued by Messrs. Entwistles Ltd., Vulcan St. Mills, Liverpool, the well-known dog, poultry and game food manufacturers.

A section of the booklet is devoted to their Dog Foods, which includes a list of testimonials received from prominent breeders and exhibitors. These letters pay a warm tribute to the value of this firm's dog food specialities for pedigree and sporting dogs.

* *Berliner Tierarzt Woch*, No. 9, March 2, 1928.

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News

THE following officers have been selected for veterinary appointments in the Colonial Service:—

W. R. Wallace, M.R.C.V.S., Veterinary Officer, Federated Malay States; G. F. Elliott, M.R.C.V.S., Veterinary Officer, Northern Rhodesia; R. Coulthard, M.R.C.V.S., Veterinary Officer, Nigeria; J. H. B. Best, M.R.C.V.S., Veterinary Officer, Nigeria; W. B. C. Danks, M.R.C.V.S., Veterinary Officer, Kenya; W. Fotheringham, M.R.C.V.S., Veterinary Officer, Kenya; R. Correll, B.Sc., M.R.C.V.S., Veterinary Research Officer, Tanganyika Territory; T. B. McClure, M.R.C.V.S., Veterinary Officer, Kenya; R. S. Kyle, M.R.C.V.S., Veterinary Officer, Tanganyika Territory.

The Salaries of Government Officials in Prussia.

IN view of the present proposed revision of scales of pay for veterinary officers, the following scale for government officials which now comes into force in Prussia will be of interest.

The total salary is made up of the "basic salary," the allowance for quarters, and an allowance for each child under 21 years of age.

The following is an extract from the scales of "basic salary" of a variety of officials in Reichmarks. (The mark is worth, approximately, a shilling.)

Prime Minister	40,000
Minister	36,000
Under-Secretary of State	24,000
Presidents of Courts of Appeal	20,000
Permanent Secretaries of Ministers	18,000
Prefects	17,000
Judges	14,000
University Curators (Administrative Posts) ...	13,000
Directors and Professors of Research Stations	10,000
Rectors of Academies (average salaries) ...	13,200
Professors (in Veterinary and other schools),	
Exceptionally	13,600
Usually 7,500, 8,100, 8,700, 9,300, 9,900, 10,500, 11,000, 11,600	

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Lecturers	5,700, 6,300, 6,700, 7,200, 7,700, 8,200, 8,600, 9,000; rarely 11,600
Higher Ministry Officials... ...	8,400 to 12,600
Professors and Lecturers at the Robert Koch Institute	5,400 to 9,600
Stud Directors and Veterinary Surgeons, Veterinary Inspectors, Laboratory Inspectors of Imported Meat, Veterinary and Chemical	4,400 to 8,400
Secretaries to Veterinary Schools, etc.	2,800 to 5,000
Demonstrators	2,000 to 2,700
Mechanics, Smiths, Head Gardeners	1,600 to 2,600

The allowance for quarters varies according to the rank of the official (five classes), and to the district (seven grades). For the first class it varies from 336 to 2,100 marks, and for the fifth from 132 to 860.

Local authorities are compelled to draw up similar scales and make provision for pensions. The previous pensions for Government officials are to be increased.

The Army Veterinary " basic salaries " in Prussia are as follows :—

Generalstabsveterinär	16,000
Generalveterinär	12,000
Generalobveterinär	9,700
Oberstabsveterinär, about	8,000
Stabsveterinär	4,800 to 6,000 and 6,900
Oberveterinär	3,400 to 3,600
Veterinär	3,800 and 4,000
Unterveterinär	2,400

The allowances for quarters are from 2,016 marks to 348, and there is an allowance of 20 marks a month per child under 21.

The pensions allowed to veterinary officers of the old army are very nearly as much as the above figures.

French Army Veterinary Service.

This is to be remodelled so as to consist of the following officers :—

Veterinary General	1
,, Colonels	8
,, Lieutenant-Colonels	18
,, Majors	68
,, Captains	118
,, 1st and 2nd Lieutenants	91

It is at present made up as follows:—

Principal Veterinary Officers, 1st Class	6
,, ,, ,, 2nd ,, ...	18
Veterinary Officers, 1st Class	69
,, ,, 2nd ,, ...	155
Assistant Veterinary Officers, 1st and 2nd Class ...	177
Total	425

In spite of proposals to make the Veterinary Service an autonomous body, or at any rate a technically autonomous body attached to the Medical Service, the Veterinary Service remains attached to the Cavalry.

The salaries of Stud Veterinary Officers are to be modified as follows:—

Principal Veterinary Officers ...	15,600 fcs. ...	About £130
Veterinary Officers, 1st Class ...	13,000 ,, ...	,, 100
,, ,, 2nd ,, ...	11,000 ,, ...	,, 90
,, ,, 3rd ,, ...	9,000 ,, ...	,, 75

These Veterinary Officers are not precluded from carrying on outside practice.

Royal Veterinary College.

Mr. Guinness, Minister of Agriculture, stated in the House of Commons yesterday that he was well acquainted with the unsatisfactory condition of the buildings of the Royal Veterinary College, and of the consequent difficulties under which the College laboured.

"The Governors," he added, "are endeavouring to obtain the necessary funds to rebuild the College, and the Ministry has promised a grant of £35,000 on a £ for £ basis towards the fund which the Governors are raising. I appreciate the importance of this subject, and I will do everything in my power to assist the College."

Personal

Mr. W. H. W. Baird, who has been attached to the Veterinary Dept., Tanganyika Territory, as entomologist, has the honour of being the first gentleman to be permanently attached to any of the veterinary departments in the Colonies in this capacity.

We can assure him that he will find a wonderful field for specialised research work in this branch of science, and the veterinary profession will look forward to receiving much help in the future from his researches.

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THE Council of the Royal Agricultural Society of England have elected Sir John McFadyean to be a life governor as a well-deserved acknowledgment of the value of the services which he has rendered as honorary veterinary adviser to the Society for a period of the last 24 years. Sir John recently retired from that position and the Council elected Professor Frederick Hobday, the recently appointed Principal of the Royal Veterinary College, to take his place.

PROFESSOR GAIGER, chief of the Department of Comparative Pathology in the University of Liverpool, is on his way to the Argentine with a view to making a research into certain diseases there, especially foot-and-mouth, and to advise the Argentine Government on certain matters of veterinary policy and importance.

ACCORDING to the *Liverpool Post and Mercury*, an influential body of Anglesey Liberals have decided to approach Professor John Share Jones, of Liverpool University, with a view to nominating him as Liberal candidate for Anglesey.

Professor Share Jones, who was appointed Director of Veterinary Education at Liverpool University in 1918, lives at Pentrebychan Hall, Wrexham, and has taken a prominent part in the local administration of East Denbighshire. He is a recognised international authority on the economics of agriculture, and takes a keen interest in all questions relating to animal husbandry, such as compulsory insurance of livestock, of which he is a strong advocate.

He has also done valuable work on the Wrexham Rural Health Committee.

His candidature would undoubtedly appeal to the agricultural section of the constituency. He is the author of the proposals concerning livestock in the Liberal Green Book, and these proposals have been very favourably commented upon.

AT the Point to Point Meeting of the Atherstone Hunt the competing race between the Queen's Own Royal Regiment of Staffordshire Yeomanry and the Prince Albert's Own Leicestershire Yeomanry was won by Major B. Hardy, of the Meynell Hunt, on "Jack-in-the-Box," the second being Capt. W. Gibson, R.A.V.C., of the Cottermore Hunt, on his chestnut mare "Chic."

Publishers' Notices

All communications should be addressed to 7 & 8, Henrietta Street, Covent Garden, London, W.C.2. Telephone: Gerrard 4646. Telegrams: "Baillière, Rand, London."

Letters for the JOURNAL, literary contributions, reports, notices, books for review, exchanges, new instruments or materials, and all matter for publication (except advertisements) should be addressed to the Editor.

Copy of advertisements should be in the hands of the publishers—Baillière, Tindall and Cox—not later than the 25th of the month, or if proof is required, not later than 23rd.

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